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Reduction in Lake Ores

A Cut of 50 Cents a Ton Now Expected

An 80,000 Ton Structural Contract Pending in New York—Pig Iron Stocks Little Changed

The question of Lake Superior ore prices for 1911 has become of first importance in the past week. Among merchant ore producers sentiment in favor of a 50-cent reduction from the level of 1910 has been more pronounced, but the issue is complicated by the attitude of some of the steel interests. The latter are concerned about the effect of a reduction in ore upon the market for finished steel. So far as pig iron is concerned, the cut in ore has been pretty well discounted.

The transfer of the conferences on the lake ore situation from Cleveland to New York was a development of the week which kept the entire trade on the qui vive. There was no definite outcome, but the perplexities of the situation have not lessened. Offers of non-Bessemer lake ore for 1911 shipment have been made at a considerable concession from the basis of 1910; and in the East sales of foreign ores at prices midway between those of 1909 and 1910 point to a lower basis both for Eastern and lake ores. In Cleveland the prediction is made with more confidence this week that the reduction on all grades of ore will be 50c. a ton.

Pig iron and finished material markets have grown quieter. Pig iron production is receding from the high point reached at the opening of April. The United States Steel Corporation has put out two furnaces in the past week and now has less than 70 per cent. of its furnace capacity active.

In foundry pig iron, under indifferent buying, prices for deliveries late in the year are getting closer to those for early shipment. Eastern pipe works have made low offers for Northern irons, but as pipe grades are not plentiful, producers are showing no eagerness to accept.

In steel-making pig iron, the largest sale reported was of 5000 tons of Northern basic to a southern Ohio steel company, shipments over the second half of the year. At Cleveland, inquiries for 6000 tons of basic iron are pending, half of it to go to Chicago. Stocks at steel works furnaces and in the yards of merchant furnaces in the Central West were reduced 700 tons, on a total of 860,000 tons in the first half of April. This compares with a reduction of 45,000 tons in March.

The ferromanganese situation has not improved and business is still done at $36.50, Baltimore. One sale of 1000 tons has been made to an Ohio steel company and another of 500 tons, also in the Central West.

Pittsburgh reports some cutting of prices on billets and sheet bars, the supply of available semi-finished steel both from producers and merchant firms showing some increase.

The chief development in structural steel was the call for bids for 80,000 tons of fabricated steel for the Interborough Rapid Transit Company, New York. It will be used for additional tracks and extensions for the Second, Third, Sixth and Ninth avenue elevated lines, including a double deck bridge over the Harlem River. Bids are wanted by April 24. Deliveries begin in three months and extend over two years. For the Insurance Exchange Building, New York, 8000 tons of steel will be furnished by the American Bridge Company. At Chicago, the Otis Building, 8000 tons was let last week, and pending business there includes 5000 and 2000 tons respectively for the buildings of the Northwestern Mutual Life Insurance Company and the Fidelity Insurance Company.

The Missouri, Kansas & Texas has bought 14,000 tons of rails, 6000 tons to be rolled at Chicago and 8000 tons at a seaboard plant for delivery at Gulf port. The Baltimore & Ohio is in the market for 7500 tons.

Manufacturers of sheets at the Pittsburgh meeting last week decided against reducing prices in spite of the recent shading. Specifications for tin plates have fallen off somewhat, at the same time that activity in the British tin plate industry is slackening, an indication that foreign competition may be sharper on the next contract for tin plates for the export oil trade. At the last letting Welsh mills could not guarantee deliveries, and the business came to this country.

The scrap market has gone from bad to worse. Offerings by railroads have been more of a factor, and in some districts rejections of dealers' shipments have added to the demoralization.

Tin in New York has again sold below the import level this week. In copper, sales of 500,000 lb. have been made at 12c. for electrolytic, but selling interests representing producers are generally holding for 12⅛c. The expectation that the February and March movement in iron and steel would help the copper situation has proved to be another forlorn hope.

Growing Pre-eminence of the Mesaba Range

The dependence of the steel industry of the United States upon the Mesaba iron range of Minnesota is brought out more strikingly than ever by the statistics of the production of Lake Superior ores in 1910. In that year, with a total of 43,442,397 gross tons from the five Lake Superior range and the three detached mines in southern and central Wisconsin, the Mesaba range contributed 29,201,760 tons, or more than 67 per cent. The Mesaba shipments were a new high record, being roundly 1,000,000 tons more than in 1909, while the shipments from all ranges were only about 850,000 tons more last year than in the preceding year. Thus the so-called "old ranges" shipped less than in 1909.

The following comparison of shipments from the various ranges in the past two years emphasizes the increasing disparity between the Mesaba range output and that of all the other ranges on Lake Superior:

	1909. Gross tons.	1910. Gross tons.
Marquette Range	4,256,172	4,392,726
Menominee Range	4,875,385	4,237,738
Gogebic Range	4,088,057	4,315,314
Vermillion Range	1,108,215	1,203,177
Mesaba Range	28,176,281	29,201,760
Miscellaneous	82,759	91,682
Totals	42,586,869	43,442,397

It is true that exploration and development work has been carried on with vigor on the old ranges in recent years, and that this has resulted in a much larger addition to the known ore reserves of the lake region than was considered possible at the time the Steel Corporation was formed. Nevertheless, accepting at par the claims made by the owners of some of the new properties on the old ranges, it is plain that Marquette, Menominee and Gogebic mining companies have strained to the utmost to make the totals of the past half dozen years, and their tendency will be toward smaller rather than greater shipments.

The Menominee range, for example, produced 5,109,000 tons in 1906, whereas its total last year was but 4,237,738 tons. The Marquette range shows a more even record in the past half dozen years. Leaving out 1908, with its sharp depression, the average output in the years 1905 to 1910, inclusive, has been about 4,200,000 tons, the minimum being 4,057,000 tons in 1906, and the maximum, 4,392,000 tons in 1910. The Gogebic range, through the tremendous activity at the Newport and the well sustained output of the Norrie group, has come up well in the past two years, making an output of 4,088,000 tons in 1909 and of 4,315,000 tons in 1910, whereas the greatest previous total was 3,705,000 tons in 1905. The Vermillion range reached its highest output in 1902 at 2,084,000 tons. In 1905 and 1906 it averaged about 1,750,000, whereas in 1909 and 1910 it dropped down to an average of 1,150,000 tons.

In view of the waning of the old ranges, relatively if not actually, special interest attaches to the development work which has been in progress in the past few years on the Cuyuna range, west of Duluth, and the Baraboo range in Wisconsin. As has been indicated by articles in these columns from time to time, both these districts will give a good account of themselves. The belief of those closest to developments on the Cuyuna range is that a good many mines will be found that will rival the Mesaba in grade, and will rank well up in tonnage. As was pointed out in an article on the Baraboo range in *The Iron Age* of March 9, page 618, unexpected finds have been made there, with prospects that the total of available ore will run well up into the hundreds of millions of tons. Of particular interest in this connection is the account given elsewhere in this issue of the work that has been in progress in the past year or two on the Vermillion range. While it is early to say definitely what may be looked for as the result of this activity, it is not unreasonable to expect a very considerable addition to the available ores of that district, which thus far has been relatively unimportant in point of tonnage, though its ores are of the highest grade.

The importance of the Mesaba range is seen in a new light in a comparison of its total output with the total of iron ore shipments from the Lake Superior region. From the first shipment of ore down the lakes in 1852 to the close of navigation in 1910 the shipments from all the Lake Superior mines amounted to 493,089,000 tons. Of this total the Mesaba range, making its first shipment in 1892, contributed 224,905,000 tons. Thus in 19 years this range, well named "giant," has produced 45.6 per cent. of all the iron ore that has come from the mines of Minnesota, Wisconsin and Michigan in the past 58 years, or more than three times the life of the Mesaba range.

Government Regulation of Prices

Washington advices state that Representative Martin of South Dakota, who has lately been appointed on the Committee on Interstate and Foreign Commerce, is planning to urge legislation which will give the Federal Government the right to regulate the prices charged by corporations which have come under the ban of the Sherman anti-trust law and are monopolies or attempted monopolies under that law. He is said to be convinced that in the absence of such regulation it will be difficult to reach these corporations effectively, as they may simply change their form, and if resolved into their subsidiary companies such companies will effect a complete understanding and continue to maintain control of the market for the commodities produced, thus simply changing the form of monopoly. It is asserted that the problem now presents itself how to follow up anti-trust decisions so as to give actual relief to the public, and that Representative Martin is convinced that Government regulation of prices would go a long way toward bettering the situation. He is said to believe that the Government has the power to do what he proposes.

It will be exceedingly interesting to see whether Mr. Martin's Congressional colleagues will support his views to a sufficient extent to embody them in practical legislation. The assumption of control of freight rates by the Interstate Commerce Commission is an important step in that direction. If the price at which railroads shall sell their transportation can be fixed by a Government agency, it would seem that railroads might with some justification demand that another Government agency should be empowered to fix the prices of such commodities as they purchase, thus insuring them low costs of what they are compelled to buy. But this carries with it the further argument that those whose prices would be so controlled should in turn have their interests safeguarded by some Government agency fixing prices on what they are obliged to buy. As it would surely be inequitable to restrain any set of manufacturers or producers from charging more than a fixed price and leave those who supply them with essential materials free to demand what they may, the regulation of prices would have to be continued until every seller of any kind of material came under control. In such a regulation of costs, could the man who sells his labor escape? In the last analysis he would be the one whose emoluments would be the most important obstacle to the leveling process. Could a Government agency make him give way and assist in the cheapening process?

It is difficult to see how national legislation can thus be invoked, even against the so-called trusts, without precipitating a most confusing state of affairs. How can the price of a manufactured product be regulated, for the purpose of penalizing a corporation, unless it be conceded as one of the powers of the Government that it can fix or regulate the price of any commodity offered for sale by any person? Will the Congressional representatives of agricultural constituencies be willing to admit that a Government agency ought to be created for the purpose of fixing the price of wheat, corn, cotton, potatoes, flaxseed, hogs and other products of the field or the farm? It is but a few months since all these commodities were soaring and the entire country was wailing over the cost of living. Was Representative Martin then straining himself to give "relief to the public" by trying to break down farmers' prices? At that time he was probably a believer in the law of supply and demand, as far as farm products were concerned. And that is the law which ultimately asserts itself, in spite of all legislation. It is that law which has so often brought about lower prices even when combinations and trusts have done everything in their power to control the market for a commodity. Congress should not attempt to interfere with the free play of this law, even to penalize a so-called monopoly.

The New Free List

The Democratic party has signalized its return to power in the House of Representatives by fathering a bill to place on the free list about a hundred articles, mainly such as are used by farmers and planters. Agricultural implements of every description, all sorts of fabric coverings for cotton bales, metal cotton ties and wire baling ties, leather and such leather goods as boots and shoes and harness, wire rods and wire fencing and fence staples, all kinds of lumber except cabinet woods, sewing machines, meats, all kinds of flour and salt are the articles thus covered. Thus the farmers who have been opposing Canadian reciprocity are to be appeased by the possibility of getting cheaper agricultural implements, wire fencing, harness, boots, shoes and salt. The Southern cotton planter, although he has taken no special interest in the reciprocity question, has always been anxious to see cotton ties on the free list, and the opportunity is seized to minister to his desires. Free meats and flour are sops to the general public. There is nothing scientific or logical about the bill as a type of tariff making. It simply wrests from their places on the dutiable list a number of articles whose transfer to the free list is likely to win political support. The country apparently demanded a further reduction of tariff duties last fall, but this bill cannot be considered a proper reply to such a demand. It demonstrates the conception of tariff revision which dominates the new House of Representatives and shows what is to be expected when the tariff as a whole is taken up for revision next winter. It will be remarkable, indeed, if such a bill as this survives the ordeal of the Senate.

The Number of Car Wheels

An inquiry having come to us recently as to the approximate number of car wheels in the country, it is interesting to observe how close an approximation can be made by data readily accessible. The latest edition of *Poor's Manual* gives the number of cars reported by the steam roads of the country as follows:

Passenger	36,245
Baggage, mail and express	13,449
Freight	2,180,324
Total	2,230,018

The above shows the number of cars at the end of the fiscal years of the railroads, June 30, 1909, for the majority, but on December 31, 1909, for quite a number. The *Railway Age Gazette* statistics of car building show the following:

1909	96,419
1910	185,357

It may be assumed that the equivalent of a year

and a half increase has occurred since *Poor's* total of 2,230,000 cars was compiled; and as few cars have been abandoned it is safe to add 200,000 to the figure, making 2,430,000 cars for the present. There are no statistics on the number of privately owned cars, but from a private estimate made some time ago by one in perhaps the best position to know, it may be estimated that at present there are about 150,000 privately owned cars running on the steam roads. We have then 2,580,000 cars running on the steam roads, the number being subject to only a small probable error. At eight wheels per car, we should have 20,640,000 wheels.

There are about 60,000 locomotives on the steam roads, some with truck wheels and all with tenders, most of which are double truck. An allowance of eight wheels per locomotive (driving wheels not being considered at all) is probably close, making 480,000 more, or a grand total of 21,120,000 wheels on the steam roads. Taking account of spare wheels, the total may be put at about 21,500,000, and it seems improbable that the actual number in existence on the steam roads of the country is as low as 21,000,000 or as high as 22,000,000.

Nothing like similar accuracy can be expected in estimating the number of wheels on electric lines, mine, logging and other industrial railroads, &c., but we may experiment by assuming for argument that there are the equivalent of 75,000 electric cars of eight wheels and 100,000 industrial cars of four wheels, which numbers would give us precisely 1,000,000 more wheels, so that the doubt in estimates as to such wheels cannot greatly affect the total, and we may therefore put the grand total of all car wheels and wheels on locomotives other than driving wheels at between 22,000,000 and 23,000,000.

The total weight of these wheels is not susceptible of such close estimation. While the standard wheels average a trifle more than three to the gross ton, there are many smaller wheels which may run four, five, and in some cases more, to the ton. If we divide our 22,500,000 wheels into three classes of 7,500,000 wheels each, and take the first class at three to the ton, we get a weight of 2,500,000 gross tons; taking the next class at 3¾ to the ton, we get 2,000,000 tons, and taking the last at five to the ton, we should get 1,500,000 tons, making a total of 6,000,000 tons. The data were taken somewhat arbitrarily, to arrive at round figures. The actual weight is perhaps in excess of 6,000,000 gross tons.

Correspondence

Safeguarding Against Fire

To the Editor: Your editorial of April 13, "Awakening to the Danger of Fire," calls attention to actual conditions amounting in some cases to almost criminal negligence. But many manufacturers, especially in the metal trades, cannot be appealed to from the loss of life standpoint, because in the spread-out single-story factory there is not the element of personal danger present in the many-storied factory buildings of a great city.

The pocketbook nerve of all factory managers is very sensitive, and all of them should be open to argument via that channel. Doubtless the reason that so many plants are inadequately safeguarded against fire is that their managers think "What's the difference? I'm fully protected by insurance." But what factory really is fully protected by insurance? Suppose the insurance is sufficient to replace all stock, shop equipment and factory buildings. What about the future time when an old customer orders repairs and has to be told "Those obsolete patterns were destroyed in our recent fire?" What will cover the loss of shop records? What will pay for the loss of trade by interruption to business?

Fire extinguishers throughout the plant, fire companies organized among the employees, and a complete automatic sprinkler system will not only pay for themselves in reduced insurance rates, but will do much to provide stability of output, which is one of the greatest assets of a live manufacturing plant.

HENRY M. WOOD.

CINCINNATI, OHIO.

The Annealing of Malleable Castings

To the Editor: I would like to ask a few questions pertaining to the article, "Annealing Malleable Castings," by W. P. Putnam, in your issue of March 23. The very first paragraph leads me to judge that all you have to do is to put a charge in the furnace, melt it, and have a good annealer. Presto! Do different classes of malleables require different mixtures? Does one need no "skill," no "judgment" to tell "burnt iron," or hot iron, when the mixture is ready for pouring?

Let us rearrange the table showing "results of annealing bars of the same composition in different foundries," according to their tensile strengths, those omitted having no temperature given:

No.	T. S.	Temp., F.	Hrs.	Total carbon.
10	50,849	2,200	96	0.40
8	47,336	1,620	208	0.80
7	45,213	1,700	144	1.32
2	44,034	1,700	144	1.94
1	40,996	1,450	112	1.49
6	40,408	1,650	72	1.71
3	39,638	1,620	101	1.47

The author says: "It will be noticed that in each case under too high a temperature or a long period of annealing, the carbon was nearly all removed. Either practice is wasteful and produces *poor* malleable for *some purposes.*" The first two bars show the greatest tensile strength and the lowest total carbon, one annealed at a high heat, the other for a long period. Will many consumers object to such a fault? And for what purposes are such malleable castings poor?

Will Mr. Putnam give an explanation for bars Nos. 7, 1, 6 and 3 being lower in total carbon than No. 2? No one of these bars was annealed at a greater heat or for a longer period than No. 2. If all castings to be machined are to have different treatment from that given others, then should all such be accumulated for one oven? Wouldn't this mean a delay to all in a small plant? What is the "different treatment"?

In the chart "proper finishing temperature for the annealing of white iron in relation to carbon contents," that for the sample bars sent to 11 different foundries is 1575 degrees F. And 10 of the 11 exceeded this from 45 to 625 degrees, and yet produced a malleable with tensile strength 40,000 to 50,849, with other physical properties relatively good!

If a scissor block and car coupler are the same carbon contents, do they require same temperature and time? Spade steps and hydraulic jack castings, too? Does the carbon content above fix the "critical and proper annealing temperature" and the time?

I agree that this department has often been neglected, but argue that the mixing and melting are more important factors—the pivot point in the plant—and that practical experience shows many fallacies in theory.

INQUIRER.

Lake Ore Prices and the Furnaceman's Situation

To the Editor: There can be no real bargain unless it has reciprocal advantages. The seller must make something and the buyer must make something. Should all the bargain in the iron business be one way, it would not be long until there would be serious trouble. If all the consumers were able to buy iron at less than it cost the furnaces to produce it, they might think they were driv-

ing a good bargain for themselves. But little by little they would force the furnaces into bankruptcy, leaving themselves at the mercy of a few of the stronger furnaces, and presently they would see iron prices at such a mark that they themselves would be in serious trouble.

At the present time there is no real bargain in lake ores. The ore men have managed to hold their ores at such a price that, while there is a very handsome profit indeed to the miners, the iron masters cannot make iron at a price that the market will take. The merchant furnaces depending on outside sources for their ore are literally, with the low prices for iron, between the devil and the deep blue sea. They are caught between the upper and lower millstones. They are not getting a reciprocal deal. Competition is the life of trade and reciprocity is the long life of trade. In ore there is neither competition nor reciprocity, and the situation is one that is well-nigh unbearable.

SOUTHERN OHIO FURNACEMAN.

The Steel Corporation's Annual Meeting

The annual meeting of the United States Steel Corporation was held at Hoboken, N. J., April 18, Chairman E. H. Gary presiding. The stockholders approved and ratified all purchases and contracts made by the directors and Finance Committee since the meeting a year ago. The following directors were elected for a term of three years: George F. Baker, W. E. Corey, John F. Dryden, Clement A. Griscom, Samuel Mather, D. G. Reid, Henry Walters, and Gardiner M. Lane. Mr. Lane was elected to succeed the late Nathaniel Thayer. He is a member of the firm of Lee, Higginson & Co., bankers, New York.

A total of 1,924,821 shares of preferred stock and of 2,900,671 shares of common stock was voted, or altogether 4,825,492 shares.

Charles A. Cabot of Boston introduced a resolution for a committee of five to investigate certain statements published in a magazine referring to labor conditions in the plants of the Steel Corporation. The article was entitled "Old Age at Forty." Chairman Gary, in reply to Mr. Cabot, said that while the article was unfair, unreasonable and partisan, and the motive in publishing it was not good, he favored the resolution. Representing by proxy a large majority of the stockholders, he would vote for the appointment of a committee of five stockholders to investigate and report its findings to the Finance Committee.

The directors of the Corporation will meet on the last Tuesday of April and elect officers, including the Finance Committee.

The National Radiator Company's Eastern Plant

Improvements and extensions are being made to the plant at Trenton, N. J., recently purchased by the National Radiator Company of Johnstown, Pa., where the Solace and Novus radiators for the Eastern market will be made. The property is on the main line of the Pennsylvania Railroad, and consists of 13 acres of land on which there is now a foundry building, 110 x 225 ft., equipped with two cupolas, &c. There is also a warehouse, 90 x 200 ft., and two new brick buildings recently completed, one 50 x 100 ft., to be used for a cleaning and testing department, and the other, 50 x 175 ft., to be used for core making purposes. A new power house, 60 x 75 ft., is to be built, which will contain the boiler equipment for supplying an engine of 225 hp., yet to be purchased.

It is expected that the Eastern plant will be ready for operation about the middle of June, and is to be under the management of Charles N. Tull. While the extensions to the plant are being made, and preparations pushed for its operation, the patterns, flasks and other equipment are being made at the Johnstown plant, and will be shipped to Trenton so as to be available for use as soon as the new plant is ready for operation.

Customs Decisions

Bayonets

For tariff purposes bayonets are "side arms." This is the conclusion reached by the Board of United States General Appraisers after the consideration of testimony submitted in a test case arising under the tariff acts of 1909 and 1897. The American Express Company and C. Hirsch & Sons Iron & Rail Company are the importers. Duty was assessed on all of the goods as "side arms," some at the rate of 35 per cent. under the act of 1897, and on the others at 50 per cent. under the present act. The importers alleged the bayonets are dutiable property at 25 per cent. under the tariff acts of both 1897 and 1909 as "parts of" muskets or rifles. General Appraiser Fischer, in his decision for the board, says that he thinks the evidence shows conclusively that the bayonet is worn at the side in a scabbard when not attached to a firearm.

Forged Iron Ladles

When the present tariff was framed a departure was made from the language used for "forgings" in the previous tariff. This has resulted in a protest by the Johnston-Morehouse-Dickey Company, Pittsburgh. The goods in controversy are invoiced as best iron ladles, and were assessed for duty at 45 per cent. under paragraph 199, act of 1909, as manufactured articles, not specially provided for, composed wholly of metal. The claim of the importers is that they are dutiable at only 30 per cent. of their value, under paragraph 123, as "forgings of iron." The ladles are made by a forging process from Swedish iron, and are used in the handling of molten metal. Subsequent to the process of forging they are more or less manipulated or tooled to remove the rough edges. According to the record, the ladle as forged had an elongated end somewhat like a handle, which has in part been cut off. After importation a handle is to be welded to the article to complete it. It is pointed out in the board's decision that the present act's provision for forgings is materially different from a clause in the corresponding act of 1897. The existing tariff extends the meaning of the term by the phrase "of whatever shape or whatever degree of manufacture." On this point, the decision says: "It is evident that the change in the language was for the purpose of limiting 'forgings' to such as are not processed beyond the original forging." The protest is overruled.

Nut Locks

The competition between German and American manufacturers of nut locks has resulted in a suit before the Board of United States General Appraisers, having for its object the raising of the tariff classification on this line of goods. The American manufacturers claim that German made nut locks are being put on the market here at prices below the cost of manufacture in this country. The test case now before the board stands in the name of the Motor Car Equipment Company. The Treasury Department having ordered collectors of customs to classify nut locks under paragraph 199 of the act of 1909, as "manufacturers of metal not otherwise provided for," objection is made by the importing interests and users of the goods in this country. The Motor Car Equipment Company contends that they should be returned for duty at three-quarters of 1 cent a pound under the tariff provision for "washers."

Several witnesses for the Government have testified that, although the domestic industry is of large proportions, the contention of the importers, if granted, would mean its extinction. They brought out clearly the difference between a nut lock and the article usually referred to as a washer. The nut locks in controversy are made from wire with a spring temper. The witnesses testifying in favor of the higher duty included representatives of the National Lock Washer Company and Positive Lock Washer Company, both of Newark, N. J.; Riverside Steel Spring Company, Riverside, N. J., and Hobbs Mfg. Company, Worcester. The board will render a decision shortly.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Apr.19, 1911.	Apr.12, 1911.	Mar.15, 1911.	Apr.20, 1910.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	$15.50	$15.50	$15.50	$17.75
Foundry No. 2, Valley furnace	13.75	13.75	13.75	15.50
Foundry No. 2, Southern, Cincinnati	14.25	14.25	14.25	15.25
Foundry No. 2, Birmingham, Ala.	11.00	11.00	11.00	12.00
Foundry No. 2, local, Chicago*	15.00	15.00	15.00	16.75
Basic, delivered, eastern Pa.	15.25	15.25	15.25	17.50
Basic, Valley furnace	13.75	13.75	13.75	16.00
Bessemer, Pittsburgh	15.90	15.90	15.90	18.40
Gray forge, Pittsburgh	14.40	14.40	14.40	16.15
Lake Superior charcoal, Chicago	17.50	17.50	17.50	19.00
COKE, CONNELLSVILLE, Per Net Ton, at oven:				
Furnace coke, prompt shipment	1.60	1.60	1.55	1.70
Furnace coke, future delivery	1.75	1.75	1.75	1.90
Foundry coke, prompt shipment	2.00	2.00	2.00	2.50
Foundry coke, future delivery	2.25	2.25	2.25	2.75
BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh	23.00	23.00	23.00	26.50
Forging billets, Pittsburgh	28.00	28.00	28.00	32.00
Open hearth billets, Philadelphia	25.40	25.40	25.40	30.00
Wire rods, Pittsburgh	29.00	29.00	29.00	32.00
OLD MATERIAL, Per Gross Ton:				
Iron rails, Chicago	14.50	14.50	15.50	18.50
Iron rails, Philadelphia	17.50	17.50	18.50	20.50
Car wheels, Chicago	13.25	13.25	13.25	16.50
Car wheels, Philadelphia	13.25	13.25	14.00	16.00
Heavy steel scrap, Pittsburgh	*12.75*	13.25	14.25	16.25
Heavy steel scrap, Chicago	11.50	11.50	12.00	14.25
Heavy steel scrap, Philadelphia	*13.25*	13.50	14.00	16.00
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia	*1.35*	1.37½	1.37½	1.50
Common iron bars, Chicago	1.25	1.25	1.27½	1.50
Common iron bars, Pittsburgh	1.35	1.35	1.35	1.60
Steel bars, tidewater, New York	1.56	1.56	1.56	1.61
Steel bars, Pittsburgh	1.40	1.40	1.40	1.45
Tank plates, tidewater, New York	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh	1.40	1.40	1.40	1.55
Beams, tidewater, New York	1.56	1.56	1.56	1.66
Beams, Pittsburgh	1.40	1.40	1.40	1.50
Angles, tidewater, New York	1.56	1.56	1.56	1.66
Angles, Pittsburgh	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh	1.30	1.30	1.30	1.50
Skelp, sheared steel, Pittsburgh	1.35	1.35	1.35	1.60
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh†	1.80	1.80	1.80	1.85
Cut nails, Pittsburgh	1.70	1.70	1.60	1.85
Barb wire, galv., Pittsburgh†	2.10	2.10	2.10	2.15
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	12.37½	12.37½	12.50	13.25
Electrolytic copper, New York	12.12½	12.12½	12.25	12.80
Spelter, New York	5.50	5.50	5.65	5.60
Spelter, St. Louis	5.30	5.30	5.50	5.45
Lead, New York	4.45	4.45	4.37½	4.40
Lead, St. Louis	4.30	4.30	4.22½	4.25
Tin, New York	*41.70*	42.25	39.75	33.05
Antimony, Hallett, New York	8.75	9.00	9.25	8.25
Tin plate, 100-lb. box, New York	$3.94	$3.94	$3.94	$3.84

* This price is at furnace and not delivered in Chicago.
† These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card effective September 1, 1909; tees, 3 in. and up, 1.45c., net; zees, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge	$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates), 3 ft. and over in length	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, $1.55 per square. Galvanized sheets, No. 28, $2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
Butt Weld.				
1 to 1½ in.			49	43
½ in.	75	63	71	59
¾ to 1½ in.	79	69	75	65
2 to 3 in.	80	70	76	66
Lap Weld.				
2 in.	76	66	72	62
2½ to 4 in.	78	68	74	64
4½ to 6 in.	77	67	73	63
7 to 12 in.	75	59	71	55
13 to 15 in.	51½	..	..	..
Butt Weld, extra strong, plain ends, card weight.				
⅛, ¼, ⅜ in.	69	59	65	55
½ in.	74	68	70	64
¾ to 1½ in.	78	72	74	68
2 to 3 in.	79	73	75	69
Lap Weld, extra strong, plain ends, card weight.				
2 in.	75	69	71	65
2½ to 4 in.	77	71	73	67
4½ to 6 in.	76	70	72	66
7 to 8 in.	69	59	65	55
9 to 12 in.	64	54	60	50
Butt Weld, double extra strong, plain ends, card weight.				
½ in.	64	58	60	54
¾ to 1½ in.	67	61	63	57
2 to 3 in.	69	63	65	59
Lap Weld, double extra strong, plain ends, card weight.				
2 in.	65	59	61	55
2½ to 4 in.	67	61	63	57
4½ to 6 in.	66	60	62	56
7 to 8 in.	59	49	55	45

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Plugged and Reamed.

1 to 1½, 2 to 3 in.	Butt Weld	Will be sold at two (2) points lower basing (higher price) than merchant or card weight pipe, Butt or Lap Weld as specified.
2, 2½ to 4 in.	Lap Weld	

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel boiler tubes to jobbers in carloads are now as follows:

	Steel.
1¾ to 2¼ in.	65
2½ in.	67½
2¾ to 3¼ in.	70
3½ to 4½ in.	72½
5 and 6 in.	75
7 to 13 in.	62½

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, $29 to $30 per gross ton. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed $1.60, galvanized $1.90; carload lots, to retailers, annealed $1.65, galvanized $1.95. Galvanized barb wire, to jobbers, $2.10; painted, $1.80. Wire nails, to jobbers, $1.80.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

Fence Wire, Per 100 Lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.75	1.80	1.85	1.90	2.00	2.10	2.20	2.30
Galvanized	2.05	2.10	2.15	2.20	2.30	2.40	2.80	2.90

Market and Stone Wire in Bundles, Discount from Standard List.

Bright and Annealed:	
9 and coarser	80
10 to 18	80 and 10
19 to 26	80 and 10 and 2½
27 to 36	80 and 5
Galvanized:	
9 and coarser	75 and 10
10 to 16	75 and 10
17 to 26	72½ and 10
27 to 36	72½
Coppered or Liquor Finished:	
9 and coarser	75 and 10
10 to 26	75 and 10
27 to 36	70 and 10 and 5
Tinned:	
6 to 18	75 and 10 and 10

Pittsburgh

PARK BUILDING, April 19, 1911.—(*By Telegraph.*)

Pig Iron.—No important inquiries are out for pig iron, and only a few small lots are being sold, of not over 300 tons. Several blast furnaces in this district and in the valleys will go out the coming week on account of the lack of demand. Prices are largely nominal, as not enough business is being offered by consumers to test the market. We quote Bessemer pig iron, $15; malleable Bessemer, $13.75; basic, $13.75 to $14; No. 2 foundry, $13.75 to $14, and gray forge, $13.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—Prices on both Bessemer and open hearth steel are not as firm as they were. Open hearth billets and sheet bars are being offered by dealers in small lots for prompt shipment at about $1 per ton under regular prices. As nearly all consumers are covered by contract, there is very little new demand, but specifications are not coming in as freely against contracts, especially from the sheet mills, as they were some time ago. The larger steel mills are still quoting regular prices, which they claim they are holding firmly, as follows: Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at $23, base, and sheet and tin bars in 30-ft. lengths, $24; 1½-in. billets, $24; forging billets, $28, base, usual extras for sizes and carbons—all prices f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(*By Mail.*)

The quietness existing in the iron trade for some months is even more pronounced. April has been a distinct disappointment so far, new orders and specifications against contracts showing a large falling off as compared with the first half of March. There is nothing in sight that indicates early betterment, and while prices of finished products in the main are being fairly well observed, this is largely for the reason that hardly enough new business is being offered to test them. Consumers are not inclined to make contracts, even when offered the privilege of doing so, for last quarter delivery. There is a distinct feeling that it is going to take strong efforts to maintain the present level of prices, and consumers are not running any risks of a decline. Further declines in iron and steel scrap have taken place, with practically no business offering.

Ferromanganese.—The market has been quiet the past week, the only reported sale being one of about 400 tons for third quarter delivery, at about $36.50, Baltimore. We quote 80 per cent. foreign at $36.50 to $36.75 in large lots and $37, Baltimore, in small lots, the rate for delivery to the Pittsburgh district being $1.95 a ton.

Ferrosilicon.—No sales are reported, and prices on 50 per cent. are weak and lower. We quote 50 per cent. at $53 to $53.50, f.o.b. Pittsburgh, for delivery through the third quarter; 10 per cent. blast furnace silicon, $23; 11 per cent., $24, and 12 per cent., $25, f.o.b. cars, Jisco and Ashland furnaces.

Muck Bar.—We quote best grades of muck bar made from all pig iron at nominally $29, delivered at buyer's mill in the Pittsburgh district. No sales have been reported in this market for some time.

Skelp.—Few new orders are being placed, and consumers are still holding up shipments, as they are not running their pipe and tube mills to full capacity. In spite of the light demand, prices are quite firm, and we quote grooved steel skelp at 1.30c.; sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—A local maker reports a sale of about 800 tons of open hearth rods of special quality, at a price equal to about $29.75, Pittsburgh, the premium of 75c. a ton having been paid for a specific guaranteed analysis. We quote Bessemer, open hearth and chain rods of ordinary carbons at $29, Pittsburgh.

Steel Rails.—The Baltimore & Ohio Railroad will double track parts of its line to Chicago, and is said to be in the market for about 7500 tons of standard sections. The Carnegie Steel Company continues to receive some fairly large orders for standard sections and light rails for export. A good part of the product of its Edgar Thomson mills has been going abroad for some time. This interest also reports new orders and specifications for about 3200 tons of light rails in the past week. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Structural Material.—An eight-story hotel is to be built at Youngstown, Ohio, which will take 2000 tons or more of steel. The Atlantic Coast Line has placed 1100 tons with the McClintic-Marshall Construction Company. Other local work in sight includes a steel bridge from Woods Run to McKees Rocks, Pa., across the Ohio River. A fair amount of work is being placed, but it is said it is being taken in some cases at cost, or below, for the fabricating. We quote beams and channels up to 15-in. at 1.40c., Pittsburgh.

Plates.—The Pittsburgh & Lake Erie Railroad has at last bought 1000 steel coke cars, 80,000 lb. capacity, from the American Car & Foundry Company and 1000 composite gondola cars, 100,000 lb. capacity, from the Pressed Steel Car Company. The Texas Company has placed 200 tank cars with the American Car & Foundry Company, and the Spokane, Portland & Seattle Railroad 14 baggage and mail cars with the Pressed Steel Car Company. The Youngstown Car Mfg. Company has received an order for 50 25-ton steel cars for the United Fruit Company of Costa Rica. The general demand for plates is dull, and none of the larger mills is operating to more than 50 or 60 per cent. of capacity. We quote ¼-in. and heavier plates in the wide sizes at 1.40c., but on the narrower sizes it is stated that a few mills are slightly shading this price.

Sheets.—A fairly well attended meeting of the sheet mills was held in Pittsburgh last week, at which present conditions in the sheet trade were thoroughly discussed. Reports showed that in certain sections some mills were shading prices, but it was pointed out that to lower prices under present conditions would not stimulate the demand, but would simply make worse the existing unsatisfactory conditions. Present prices were reaffirmed, all mills represented agreeing to maintain the regular schedule. Prices in effect on black, galvanized and roofing sheets are printed on a previous page. The Hyde Park plant of the American Sheet & Tin Plate Company, containing six hot mills, was

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started last week, the output of sheets being shipped to Vandergrift, Pa., for galvanizing.

Tin Plate.—The new demand is very dull, and there has been a distinct slowing up in specifications. This is hardly understood by the tin plate mills, as usually at this season specifications are very active. The American Sheet & Tin Plate Company is operating some of its larger mills only four days a week, while a number of independents are running at a lighter capacity, owing to the falling off in new demand and specifications. The American Sheet & Tin Plate Company will add 10 new tinning stacks to its tin plate mill at Ellwood, Ind. We quote 100-lb. cokes for delivery through the third quarter at $3.70 per base box, Pittsburgh.

Bars.—Both iron and steel bars are quiet, few orders coming in from the car building interests, while the wagon and implement makers are only having a fair amount of new business, and are not specifying freely against their contracts. Prices on both iron and steel bars are weaker, but as yet there has been no distinct decline. We quote steel bars at 1.40c. and common iron bars at 1.35c., Pittsburgh.

Shafting.—There is a fair run of new orders, mostly for small lots, but specifications against contracts are not coming in well. Discounts on cold rolled shafting remain at 57 per cent. off in carloads and 52 per cent. in less than carloads, delivered in base territory, but in exceptional cases these discounts are shaded.

Spelter.—The market is weaker, and we quote prime grades nominally at 5.30c., East St. Louis, equal to 5.42½c., Pittsburgh.

Hoops and Bands.—Specifications against contracts are coming in at only fairly satisfactory rate, while the new demand is light and only for small lots. There is no disposition on the part of the consumers to carry heavy stocks. We quote steel hoops at 1.45c. and bands at 1.40c., extras on the latter being charged as per the present steel bar cards.

Merchant Steel.—New orders and specifications show a heavy falling off, as compared with the first half of March, and shipments by the mills this month will no doubt be much lighter than last month. The new demand is from hand to mouth. We quote the higher grades of merchant steels, f.o.b. Pittsburgh, as follows: Iron finished tire, ½ x 1½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—The market on both structural and boiler rivets is practically open. In a general way structural rivets are now quoted at 1.85c. to 1.90c. and boiler rivets about 1.90c., but on some recent orders these prices were very materially shaded.

Wire Products.—There has been a decided slowing up in the new demand, and specifications so far this month have been much below those received in the first half of March. The mills, however, have a good deal of business on their books for delivery over the next month or two. It appears that a very limited amount of new business in wire nails and wire has been placed with the mills since the last advance in prices was made. We quote galvanized barb wire at $2.10; painted, $1.80; annealed fence wire, $1.60; galvanized, $1.90; wire nails, $1.80, and cut nails, $1.70, f.o.b. Pittsburgh, full freight to destination added.

Spikes.—Specifications against contracts and new orders so far this month are much below those of the last half of March, but this is explained by the fact that an advance of 5c. per keg went into effect April 1. New inquiries are light and are only for small lots to cover actual needs. The base price of railroad spikes is $1.60.

Merchant Pipe.—No large oil or gas lines are actively in the market, and the general demand for merchant pipe is only fairly active. However, it can be said that present conditions in the pipe trade are more satisfactory than are most other finished lines. It is stated that regular discounts on both iron and steel pipe are being absolutely maintained.

Boiler Tubes.—Most consumers of boiler tubes are covered by contracts up to July 1 or longer, against which specifications are coming in at a fairly satisfactory rate. The new demand is light and only for small lots. A new list of discounts and also a new classification of sizes were recently put into effect, and are printed on a previous page.

Coke.—Most consumers of blast furnace coke are covered by sliding scale contracts, but several furnaces that are not covered with a regular supply are buying from month to month. A sale of about 10,000 tons of standard blast furnace coke for May delivery is reported at $1.65 per net ton at oven. The output of coke in the Upper and Lower Connellsville regions last week was 362,769 net tons, a decrease over the previous week of 6000 tons. We quote standard makes of 72-hour foundry coke at about $2 for prompt shipment and $2.25 to $2.40 per net ton, at oven, for delivery over the remainder of the year. We quote standard makes of furnace coke for prompt shipment at $1.60 to $1.65, and for delivery over the next six months from $1.80 to $2 per net ton, at oven.

Iron and Steel Scrap.—A heavy tonnage of iron and steel scrap was sold by the Pennsylvania and the Baltimore & Ohio railroads last week, most of it going directly to consumers. The prices obtained were much lower than on previous lists. In addition to the embargo on scrap routed for Monessen, Pa., there is also an embargo at Follansbee, W. Va., and this is helping to force down prices, especially on heavy melting scrap. There is absolutely no new buying, most consumers having all the scrap they will use in the next month or two. Heavy steel scrap is now being offered at a lower price than was in effect prior to the upward movement which took place early in February. Dealers quote as follows, per gross ton, f.o.b. Pittsburgh, or elsewhere as noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery	$12.75 to $13.00
No. 1 foundry cast	13.75 to 14.00
No. 2 foundry cast	12.75 to 13.00
Bundled sheet scrap, at point of shipment	9.00 to 9.25
Rerolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	14.50
No. 1 railroad malleable stock	12.50 to 12.75
Grate bars	10.50 to 10.75
Low phosphorus melting stock	16.75 to 17.00
Iron car axles	24.25 to 24.50
Steel car axles	18.50 to 18.75
Locomotive axles	23.00
No. 1 busheling scrap	12.50 to 12.75
No. 2 busheling scrap	9.00 to 9.25
Old car wheels	13.50 to 13.75
Sheet bar crop ends	15.50 to 15.75
*Cast iron borings	8.75 to 9.00
*Machine shop turnings	9.25 to 9.50
Old iron rails	16.00 to 16.25
No. 1 wrought scrap	14.25 to 14.50
Heavy steel axle turnings	10.25
Stove plate	10.50 to 10.75

* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Chicago

FISHER BUILDING, April 19, 1911.—(*By Telegraph.*)

Business conditions in almost every branch of commercial activity are at direct variance with the basic conditions that should dominate. Never in the history of North America have crop prospects been brighter. The splendid probabilities in agricultural districts were still further improved this week by generous rainfall in practically every agricultural section of the United States. Wire and cast iron pipe activity reflects this good condition in the country, yet practically every other item of this market report is, to say the least, quiet. It seems to be a battle between natural and man-made forces.

Pig Iron.—Conditions in the pig iron market are still inactive, though the week under review has brought out a few inquiries which seem to be more than feelers. A Chicago investor is reported to be in the market for between 1000 and 2000 tons of No. 2 analysis, with every prospect of purchasing what he believes to be a good investment. A prominent manufacturer of pipe fittings and plumbers' supplies is inquiring for 1500 tons, 1000 tons of which is No. 2 analysis and 500 tons high silicon. An Illinois manufacturer of agricultural implements is reported to be in the market for 800 tons, half of which is No. 2 soft and half No. 3 foundry. Some sales have been made, though none of very large tonnage has been closed. The aggregate total is, however, much better than reported in the preceding two weeks. Business is still very slack among jobbing foundries. An opinion seems to prevail among buyers that prices are low enough, but the disposition to await developments is holding back considerable business that would probably be placed under normal conditions. Southern iron is still quoted at $11, Birmingham, for early delivery, and this price has been extended to deliveries running through the entire last half. The following quotations are for Chicago delivery, with the exception of Northern irons, which are now quoted f.o.b. furnace, the minimum quotations being for April, May and June shipment and the maximum for third quarter delivery:

Lake Superior charcoal	$17.50 to $18.00
Northern coke foundry, No. 1	15.50 to 16.00
Northern coke foundry, No. 2	15.00 to 15.50
Northern coke foundry, No. 3	14.75 to 15.25
Northern Scotch, No. 1	16.00 to 16.50
Southern coke, No. 1	15.85 to 16.35
Southern coke, No. 2	15.35 to 15.85
Southern coke, No. 3	15.10 to 15.60
Southern coke, No. 4	14.85 to 15.35
Southern coke, No. 1 soft	15.85 to 16.35
Southern coke, No. 2 soft	15.35 to 15.85
Southern gray forge	14.60 to 15.10
Southern mottled	14.60 to 15.10
Malleable Bessemer	15.00 to 15.50
Standard Bessemer	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%	17.90 to 18.40
Jackson Co. and Kentucky silvery, 8%	18.90 to 19.40
Jackson Co. and Kentucky silvery, 10%	19.90 to 20.40

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(*By Mail.*)

Billets.—No sales of note have been made. The leading interest continues to maintain its established price of $30.60, base, Chicago, on open hearth forging billets, and $25.60, base, Chicago, on rerolling billets.

Rails and Track Supplies.—A fair tonnage of rails has come into this market in the past seven days, although mills are running far from full, and even if the inquiries now afloat should all materialize at one time they could probably be taken care of without any great delay. The Missouri, Kansas & Texas has placed its rail order, and 6000 tons were given to the leading interest. It is understood that the balance of this order, which amounted to about 8000 tons, was placed in the East and will be shipped by water to Texas points. The Burlington is in the market for considerable tonnage of standard sections, and the Pere Marquette will probably place its order for between 3000 and 4000 tons of standard sections in the near future. Light rails and track supplies continue active. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.30½c., Chicago.

Structural Material.—Business has been decidedly quiet and there is a scramble every time a new letting appears in this market. The most important deal closed this week is the Otis Building in Chicago, which was let to the American Bridge Company. This structure will consume approximately 8000 tons of steel. The general contract for the new plant of the American Brake Shoe & Foundry Company was awarded to the Lackawanna Bridge Company and the construction of the buildings will be begun at once. There is no life or snap to business, and it is rumored stronger than ever that price concessions are the rule of the day. Western railroads are doing practically no buying, and their bridge work seems to be at a standstill. We quote plain material from mill 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—Many rumors of price cutting on plates are afloat, but it is felt that concessions will do little toward brightening the market, and the principal producers are firmly maintaining prices. We quote mill prices 1.58c. to 1.63c.; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—With but a small amount of business in sight, mills continue to run at about two-thirds capacity. Prices are being maintained by the power of producers rather than by strength of demand, and continue for Chicago as follows: Carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—Both bar iron and steel are inactive. Agricultural purchases seem to have been pretty well made and railroads are furnishing but a small portion of the usual business that emanates from this source. Mills are running a little better than half capacity and the general market is weak. Prices are as follows: Soft steel bars, 1.58c.; bar iron, 1.25c. to 1.30c.; hard steel bar rolled from old rails, 1.30c. to 1.35c., all Chicago; from store, soft steel bars, 1.80c. to 1.90c., Chicago.

Wire Products.—The real rush of the spring trade in wire products is about over. As the warm weather advances northward, various sections of the country have taken up spring fencing, and smaller communities have resumed building activities that usually lie dormant in such places during the winter months. At the present time the very northernmost row of States are coming into the market, and Northwestern jobbers who have been somewhat behind those of the South are beginning to note improved trade in all kinds of wire products. Mills are still very active, and will be for some weeks, but it is now evident that the rush of spring business will be cared for without delays in shipments. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire No. 9 and coarser, base, 1.78c.; wire nails, 1.98c.; painted barb wire, 1.98c.; galvanized, 2.28c.; polished staples, 1.98c.; galvanized, 2.28c., all Chicago.

Cast Iron Pipe.—Business has not been quite as active as for several weeks. There has been very little railroad buying, and no large municipal letting. Numerous small deals have been closed, however, the most important among these being 700 tons of water pipe to Grand View Height, Ohio, which went to the leading interest. Firmback, Ohio, has also placed its order for 400 tons of water pipe with the same company and will begin installing its water system at once. There has been little buying among the gas companies, though this is to be expected, as the season for large lettings of this nature is pretty well past. Prices remain firm, per net ton, Chicago: Water pipe, 4-in., $25.50; 6 to 12 in., $24.50; 16-in. and up, $24, with $1 extra for gas pipe.

Old Material.—Extreme quietness prevails in the scrap market. Mills have accumulated stock sufficient to supply anticipated wants for some little time and are being offered everything they need. Prices have continued to fall off here and there, though scarcely enough trading is being done to well establish values. Consumers are apparently not inclined to hammer prices down and when in need are buying at market quotations. An occasional sale gives evidence that the market still retains vitality, and between long pauses purchases of fair size have held out some little hope for the future. The Milwaukee Railroad sold its offering of 500 tons of car wheels at $13.25. The enormous accumulation of the Santa Fe evidently failed to bring forth satisfactory offers, and we may expect to hear from this list again. Prices are for delivery to buyers' works, all freight and transfer charges paid, and are as follows, per gross ton:

Old iron rails	$14.50 to $15.00
Old steel rails, rerolling	13.25 to 13.75
Old steel rails, less than 3 ft	12.75 to 13.25
Relaying rails, standard sections, subject to inspection	23.00 to 24.00
Old car wheels	13.25 to 13.75
Heavy melting steel scrap	11.50 to 12.00
Frogs, switches and guards, cut apart	11.75 to 12.25
Shoveling steel	11.00 to 11.50

The following quotations are per net ton:

Iron angles and splice bars	$12.50 to $13.00
Iron arch bars and transoms	14.00 to 14.50
Steel angle bars	11.00 to 11.50
Iron car axles	19.00 to 19.50
Steel car axles	18.00 to 18.50
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	10.50 to 11.00
Steel knuckles and couplers	10.50 to 11.00
Locomotive tires, smooth	17.00 to 17.50
Steel axle turnings	7.75 to 8.25
Machine shop turnings	6.50 to 7.00
Cast and mixed borings	5.25 to 5.75
No. 1 busheling	9.25 to 9.75
No. 2 busheling	7.25 to 7.75
No. 1 boilers, cut to sheets and rings	8.25 to 8.75
Boiler punchings	12.00 to 12.50
No. 1 cast scrap	11.50 to 12.00
Stove plate and light cast scrap	9.50 to 10.00
Railroad malleable	11.00 to 11.50
Agricultural malleable	9.75 to 10.25
Pipes and flues	8.25 to 8.75

Philadelphia

PHILADELPHIA, PA., April 18, 1911.

Outside of negotiations pending for low grades, the pig iron market is practically at a standstill. In finished products the demand is quieter, although considerable small fabricated work in both buildings and bridges is being figured on, but prices are ragged, competition being keen. No improvement in the demand for billets or sheets is reported. Refined iron bars are dull and prices have slightly receded. Old materials are easier.

Iron Ore.—Consumers are showing little interest in the market, and a suspension of any important business in foreign ores is expected until something more definite regarding lake ore prices is learned. Importations at this port during the week ending April 15 included 6515 tons of Spanish and 5300 tons of Cuban ore, valued in the aggregate at $27,149. Importations of Cuban ore at Baltimore in March totaled 63,300 tons. The first of the season's shipments of Wabana (Newfoundland) iron ore by the Nova Scotia Steel & Coal Company, Ltd., to Philadelphia will arrive next week. The new steamship Tellus, carrying 12,000 tons, will transport the initial cargo, consigned to several eastern Pennsylvania furnaces.

Pig Iron.—The market has been practically bare of any important development. The lack of new business is not causing producers in this district any particular anxiety, as they are shipping freely against orders already in hand, and, on the average, deliveries have been in excess of the current make. The majority of the producers report decreasing stocks. Consumption is believed to be on a somewhat better basis, evidenced by the increasing volume of instructions for urgent deliveries. Last week was one of the dullest that the trade has experienced for a long time. Buyers and sellers are still inclined to await developments before entering on any important negotiations on which the delivery covers the third quarter and last half of the year. Some moderate sales of foundry grades, on which delivery extends into the third quarter, are reported at prices now prevailing for second quarter delivery. The most important negotiations under way at this time are in low grade irons. The cast iron pipe interests are still considering purchases, but there is a considerable difference of opinion regarding prices. With Northern low grade for second quarter delivery scarce, sellers do not show any disposition to meet buyers' views. The bulk of the actual business transacted in this market recently

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has been in the higher foundry grades, pretty generally confined to small prompt lots, for which the recent range of prices, $15.50 to $16, delivered in this vicinity, still prevails. For third quarter shipment sellers still refuse to make open quotations, although they do not seem so firmly disposed to anticipate a higher range than the present top of the market. On the other hand, consumers, while not expecting any lower quotations, are in a number of cases willing to take their chances if they cannot now purchase for third quarter at the present market. There has been no pronounced buying of Virginia foundry grades, and sellers are holding firmly at $13, furnace, for No. 2 X and No. 2 plain grades, for shipment over the remainder of the second quarter, beyond which they are not yet willing to sell. Forge iron has been quiet. There is practically an entire absence of demand for steel making grades. Eastern consumers of basic iron show no interest in the market, while the movement in low phosphorus is along very narrow lines. The following range of prices represents the market for standard brands, delivered in buyers' yards, eastern Pennsylvania and nearby points, in the second quarter:

Eastern Pennsylvania, No. 2 X foundry	$15.50 to $16.00
Eastern Pennsylvania, No. 2 plain	15.25 to 15.50
Virginia, No. 2 X foundry	15.80 to 16.00
Virginia, No. 2 plain	15.80 to 16.00
Gray forge	14.75 to 15.25
Basic	15.25 to 15.50
Standard low phosphorus	21.50 to 22.00

Ferromanganese.—An inquiry from an Eastern mill for 500 tons for July-December delivery is in the market. There is still some uncertainty regarding prices, and while $37, Baltimore, has been named for small lots, it is believed that that figure could be shaded 50c. a ton. Several sellers have, however, withdrawn from the market at the present price level.

Billets.—Week after week mills have reported business as of a hand-to-mouth character, and consumers appear to be satisfied to continue to buy in small lots for prompt delivery. Prices remain unchanged, $25.40 being named for rolling billets, and $30.40 for ordinary forging billets, delivered in buyers' yards in this vicinity.

Plates.—Mills report about the average number of orders, including considerable business in locomotive and boiler plates, but they are of rather small size, and the aggregate volume coming in is still below that of several weeks ago. There is a fair amount of new business in sight, particularly for boat steel, and with mills operating at 70 to 75 per cent. of capacity the situation is not as bad as it might be. The demand for plates for fabricated structural work continues rather good; in fact, business is said to be pretty generally distributed. Notwithstanding reports that concessions had been made in the West, prices of plates are firmly maintained in this district at 1.55c., minimum, delivered.

Structural Material.—Continued reports of low prices for fabricated work are current, and in some instances absurdly low figures have been said to have been named, but lacking confirmation. Nevertheless, at the prevailing prices of plain material a loss is evidently being taken on a considerable portion of the smaller jobs, on which there has been any marked competition. Under such conditions negotiations close slowly, and while fabricators are figuring on considerable work, the amount placed is small. There has been a moderate demand for miscellaneous plain material, for which prices are firmly maintained, at 1.55c., minimum, delivered in this territory.

Sheets.—In a number of instances Eastern makers' mills are again operating at full capacity, the general run of orders being somewhat heavier, but there is still an absence of forward business and makers are unable, as a rule, to figure more than a week ahead. Eastern mill quotations for prompt deliveries are unchanged and named as follows: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Coke.—While a few small contracts for the best grades of foundry coke have been made at the top of the market, $2.40, at oven, sales of what is reported as good coke have been made for prompt shipment at $2, at oven. There is little demand for forward furnace coke, the bulk of the movement being for near future delivery, on which quotations range from $1.55 to $1.65, at oven. The following range of prices, per net ton, is named for deliveries in buyers' yards in this district:

Connellsville furnace coke	$3.70 to $4.05
Foundry coke	4.15 to 4.55
Mountain furnace coke	3.30 to 3.65
Foundry coke	3.75 to 4.15

Bars.—The demand for refined iron bars has been lighter and mills show a greater anxiety for orders, as a result of which prices have sagged slightly. For the ordinary run of business 1.37½c. is still asked, but orders carrying desirable specifications have been taken at 1.35c., delivered in this district, and it is said that the latter figure has been shaded. About 1.35c. to 1.42½c., delivered, represents the range of the market for general business. Steel bars are moderately active at unchanged prices, 1.55c., delivered.

Old Material.—Continued dullness, with weakening prices, represents the situation. Buyers show little interest in the market, and, while they take on occasional small lots, the business is usually done at a price concession. Choice No. 1 heavy melting steel to pass rigid inspection has been sold at $13.75, delivered, several 1000-ton lots being reported, but under the ordinary classification this grade of material can be had at $13.25, delivered. Rolling mill grades are quiet. In the majority of articles on the list hardly enough business has been done to establish quotations. The following range of prices, however, while to some extent nominal, about represents the market for deliveries in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to $1.35 per gross ton:

No. 1 heavy melting steel scrap	$13.25 to $13.75
Old steel rails, rerolling	14.50 to 15.00
Low phosphorus heavy melting steel scrap	17.75 to 18.25
Old steel axles	20.00 to 20.50
Old iron axles	25.00 to 26.00*
Old iron rails	17.50 to 18.00*
Old car wheels	13.25 to 13.75
No. 1 railroad wrought	16.00 to 16.50
Wrought iron pipe	13.50 to 14.00
No. 1 forge fire	11.75 to 12.25
No. 2 light iron	7.50 to 8.00*
Wrought turnings	8.75 to 9.25
Cast borings	8.25 to 8.75
Machinery cast	13.75 to 14.25
Railroad malleable	12.00 to 12.50
Grate bars	11.50 to 12.00
Stove plate	10.50 to 11.00

* Nominal.

Cincinnati

CINCINNATI, OHIO, April 19, 1911.—(*By Telegraph.*)

Pig Iron.—A local pipe foundry has ordered 1000 tons of Southern No. 3 foundry for practically prompt shipment. A southern Ohio steel company took 5000 tons of Northern basic for shipment running through the last half. A local melter bought 1000 tons of Northern No. 2 foundry for April and May. All the foregoing contracts are understood to have been taken at prices nearly corresponding to those quoted for prompt shipment. Other sales include 200 tons of Southern No. 2 foundry at $11, Birmingham, and the same tonnage of Southern No. 1 soft at $11.50, both for prompt shipment, to Indiana and Illinois territory, respectively. Carload orders show a marked decrease, and inquiries have dwindled to a very small number, with nothing in sight to indicate a change in the near future. It is stated that a central Western consumer, who was willing to take on a considerable tonnage of basic for future delivery, has now decided to await developments in the business situation. However, there seems to be a general undercurrent of optimism among both producers and consumers, which has doubtless tended to support spot shipment prices, and if there has been any cutting in the quotations of $11, Birmingham, for Southern, and $14, Ironton, for Northern No. 2 foundry, it is confined to a few limited lots, where special conditions prevailed, but contracts for the entire year can be made at present prompt delivery prices. For April-May movement 100 tons of Southern gray forge changed hands at $10, at furnace. Malleable is dull and unchanged, at $14 to $14.25, Ironton. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry	$14.75
Southern coke, No. 2 foundry	14.25
Southern coke, No. 3 foundry	13.75
Southern coke, No. 4 foundry	13.50
Southern coke, No. 1 soft	14.75
Southern coke, No. 2 soft	14.25
Southern gray forge	13.00
Ohio silvery, 8 per cent. silicon	17.70
Lake Superior coke, No. 1	15.70
Lake Superior coke, No. 2	15.20
Lake Superior coke, No. 3	14.70
Standard Southern car wheel	25.25
Lake Superior car wheel	19.50

(*By Mail.*)

Coke.—Practically all foundry coke consumers whose contracts expired April 1 have filled their requirements, and it will be at least 30 days before any new business is looked for from this source. There is also a falling off in the number of carload orders to fill immediate wants. Prices of foundry coke, however, remain the same, and $2 per net ton, at oven, is quoted for prompt shipment and $2.25 to $2.40 for future delivery. One Wise County interest is asking the same price for prompt shipment, as it is willing to take on time contracts at, namely, $2.25. Furnace coke, especially in the Connellsville field, is not quite so strong, and standard grades are obtainable for spot shipment at

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$1.50 to $1.55 per net ton at oven, and from $1.65 to $1.70 on contracts. Wise County and Pocahontas furnace coke commands a few cents premium over the quotations given.

Finished Material.—Reports as to any concessions in prices cannot be confirmed here, although iron bars are reported as not being so firm. Structural material continues to move from warehouse stocks in small quantities, but there is some large local business in sight. Hoops and bands are not being contracted for freely. Railroad track material is moving a little better. We continue the mill quotation of 1.40c. and the average warehouse price of 1.90c., covering structural material, steel bars, plates, &c.

Old Material.—Dealers do not look for any early improvement in the market, and are very indifferent about making offers even on small lots of scrap. A number of them have about as much stock as they care to carry under present market conditions. No large lots of railroad scrap are being offered, and buying both on the part of the dealer and consumer is confined to small tonnages. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton	$11.50 to $12.00
Cast borings, net ton	4.50 to 5.00
Steel turnings, net ton	5.75 to 6.25
No. 1 cast scrap, net ton	10.00 to 10.50
Burnt scrap, net ton	7.50 to 8.00
Old iron axles, net ton	16.50 to 17.00
Bundled sheet scrap, gross ton	7.50 to 8.50
Old iron rails, gross ton	14.00 to 15.00
Relaying rails, 50 lb. and up, gross ton	21.00 to 22.00
Old car wheels, gross ton	11.50 to 12.50
Heavy melting steel scrap, gross ton	10.00 to 10.50

Cleveland

CLEVELAND, OHIO, April 18, 1911.

Iron Ore.—Prices for 1911 have not yet been named, but it is very probable that this question will be disposed of before the end of the present week. Indications are growing stronger every day that a reduction of 50c. a ton will be made on all standard ores. A meeting of the leading ore interests was held April 12, at which the situation was discussed, but definite action was deferred until another meeting. Two ore sellers that act independently of the others are making reservations, but are declining to name prices until the leading ore firms take action on the matter. Some tonnage of off grade ore has been sold at about last season's prices, but prices on these ores were quite low during 1910. The ore shipping season opened this week. The first cargo shipped from Escanaba is expected to arrive at a lower lake port late in the week. The Pittsburgh Steamship Company has notified its masters to have their boats ready to start by April 24. Some will be started this week and all will probably be in commission by May 1. We quote prices as follows: Old Range Bessemer, $5; Mesaba Bessemer, $4.75; Old Range non-Bessemer, $4.20; Mesaba non-Bessemer, $4.

Pig Iron.—The market shows little activity. Some foundry iron in small lots is being sold, but no inquiries of any size are coming out. Inquiries for 6000 tons of basic iron are pending. One is from southern Ohio for 3000 tons for the second quarter and the other is from Chicago for a similar tonnage for the third quarter. There is an inquiry from Sharon, Pa., for 500 tons of gray forge for the second quarter. Southern iron is held at $11, Birmingham, for No. 2 for the second quarter, but it is believed that this price might be shaded on a round lot for spot shipment. Prices on Northern foundry iron are steady at $14.25 to $14.50, Cleveland, and Valley furnaces for No. 2 for the last half, and $13.75 to $14 for the second quarter. For prompt shipment and the second quarter we quote, delivered, Cleveland, as follows:

Bessemer	$15.90
Northern foundry, No. 1	14.50
Northern foundry, No. 2	14.25
Northern foundry, No. 3	14.00
Gray forge	13.50
Southern foundry, No. 2	15.35
Jackson Co. silvery, 8 per cent. silicon	18.00

Coke.—The market is very dull. Foundries are buying only in carload lots and generally are allowing their stocks to run low. Orders are mostly for quick shipment. There is no inquiry for furnace grades. We quote standard Connellsville furnace coke at $1.60 to $1.65 per net ton, at oven, for spot shipment, and $1.75 to $2 for the last half. Connellsville 72-hour foundry coke is held at $2 for prompt shipment and $2.25 to $2.50 for the last half.

Finished Iron and Steel.—The demand shows a slight falling off in both new orders and specifications on contracts. Orders are nearly all for small lots. There is a fair demand for structural material, and local fabricators report an improvement in prospective work, for which bids have been asked. The Forest City Steel & Iron Company, Cleveland, has taken the contract for 350 tons of structural steel for a new building to be erected by the National Carbon Company, Cleveland. The Toledo Bridge & Crane Company, Toledo, Ohio, has taken the contract for a new sugar plant to be erected by the Dyer Company, Cleveland, in Monte Vista, Colo. This will require 400 tons. Inquiries are out for the Commercial Building, Cleveland, that will take 400 tons of steel, and for the Free Press Building in Detroit. The demand for steel bars and plates is not active. Prices on steel bars, plates and structural material are firm at 1.40c., Pittsburgh. The demand for sheets continues only moderate. Slight price concessions are being made by some of the independent mills. The rivet market continues weak, prices as low as 1.70c., Pittsburgh, being reported on boiler rivets. With the low prices going, the usual differential of $2 a ton between boiler and structural rivets has practically disappeared. The demand for iron bars is very light. While the general quotation is 1.30c. to 1.35c., at mill, the lower quotation is not always being maintained. Jobbers are getting a fair volume of warehouse orders, but very little mill business. Railroad orders in this territory are very scarce.

Old Material.—The market continues very dull and prices are weaker. Consumers are offering from 50c. to 75c. a ton less for nearly all grades than a week ago. Dealers are accepting the lower prices for scrap on cars, but for shipment from yards are generally holding to recent quotations, so that at present only small lots can be bought at the prices the mills are willing to pay. Local mills refuse to offer over $12 to $12.25 for heavy melting steel, and we quote this grade 50c. lower than a week ago. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails	$13.50 to $14.00
Old iron rails	16.00 to 16.50
Steel car axles	19.50 to 20.00
Heavy melting steel	12.00 to 12.50
Old car wheels	12.50 to 13.00
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	11.50 to 12.00
Railroad malleable	12.75 to 13.00
Light bundled sheet scrap	8.00 to 8.50

The following prices are for net ton, f.o.b. Cleveland:

Iron car axles	$21.00 to $21.50
Cast borings	6.50 to 6.75
Iron and steel turnings and drillings	7.25 to 7.75
Steel axle turnings	9.00 to 9.25
No. 1 busheling	10.50 to 11.00
No. 1 railroad wrought	13.00 to 13.25
No. 1 cast	11.75 to 12.00
Stove plate	10.75 to 11.00
Bundled tin scrap	11.00 to 11.50

Buffalo

BUFFALO, N. Y., April 18, 1911.

Pig Iron.—The market continues very dull, with light sales and limited inquiry, confined principally to last half requirements. While apathy is manifested by buyers, apparently little soliciting is being done by producers. The only sales reported run in small lots, and totalling but little over 1500 tons, foundry grades. One inquiry of about 3000 tons is pending since last week, and not placed as yet. Prices are unchanged. We quote as follows, f.o.b. Buffalo, for second quarter delivery:

No. 1 X foundry	$14.25 to $14.75
No. 2 X foundry	14.00 to 14.50
No. 2 plain	13.75 to 14.00
No. 3 foundry	13.50 to 13.75
Gray forge	13.25 to 13.50
Malleable	14.00 to 14.50
Basic	14.25 to 15.00
Charcoal	16.75 to 17.50

Finished Iron and Steel.—A fair amount of trade in nearly all lines is reported by most of the sales agencies. Wire products are somewhat livelier than a week ago, and plain structural material shows an increasing demand for small and moderate sized jobs, of which there are a good number in hand. The Canadian export trade continues good, one order of 2000 tons of bar material being noted. Bids went in last week on 600 tons of steel for the McCurdy-Norvell department store, Rochester, and specifications will soon be out for bids for about 500 tons for a large manufacturing building to be erected by the Hickey-Freeman Company, also at Rochester. The Wurtz & Son Iron Works has received the contract for the fabrication and erection of the steel for the Lauber store and loft building, Broadway, Buffalo, and the Claremont apartment, Buffalo, each requiring about 100 tons, and the Lackawanna Bridge Company has taken the contract for the St. Mary's Academy building, Syracuse, 150 tons. The contract for the steel for a public school in Rochester, 100 tons, went to F. L. Hughes of that city.

Old Material.—Dull and stagnant conditions continue, and no new buying is noted, consumers apparently being out of the market for the present, notwithstanding that deliveries on a majority of contracts have been completed. Prices continue weak. The very small amount of business going is

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entirely between dealers. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$12.00 to $12.50
Low phosphorus steel	16.00 to 16.50
No. 1 railroad wrought	14.00 to 14.25
No. 1 railroad and machinery cast scrap	13.50 to 14.00
Old steel axles	19.00 to 19.50
Old iron axles	22.50 to 23.50
Old car wheels	13.75 to 14.25
Railroad malleable	13.50 to 13.75
Boiler plate	10.50 to 10.75
Locomotive grate bars	10.75 to 11.25
Pipe	9.00 to 9.25
Wrought iron and soft steel turnings	6.50 to 7.00
Clean cast borings	6.00 to 6.25

St. Louis

ST. LOUIS, MO., April 17, 1911.

A little better inquiry for pig iron developed the past week and specifications on contracts are reported to be coming in satisfactorily. Some large coke buyers are in the market for considerable tonnages. The demand for finished iron, steel and metals is moderate. Bank clearings continue heavy, and there is a good degree of activity in building operations. Crop prospects in general in the Mississippi Valley and the Southwest are excellent.

Pig Iron.—Some of the leading brokers report a slight improvement in inquiry, but actual business has been no better; in fact, it is not probable that much over 1000 tons was sold in the aggregate last week, which is less than was mentioned in our last report. Nominally the market is unchanged and we quote for No. 2 Southern foundry, for shipment over the second quarter, $11; for the last half, $11 to $11.50, Birmingham; for No. 2 Northern, shipment over the second quarter, $14; for the last half, $14.50, Ironton, Ohio.

Coke.—While the inquiry for coke is not general, there are a few large buyers in the market. One office reports an inquiry from a local steel foundry for 1500 tons, part foundry and part furnace. Another seller has an inquiry for a large tonnage of by-product coke, and a third mentions an inquiry from an outside consumer for 5000 tons of foundry for shipment over 20 months. The only sales of importance were 20 carloads to various parties. A firmer tone is noted. We quote for selected Connellsville 72-hour foundry, for shipment over the remainder of the year, $2.25 per net ton, at oven; carload lots 25c. per ton higher.

Finished Iron and Steel.—The Missouri, Kansas & Texas Railroad has closed a contract for 100 miles of standard rails. No new inquiry is reported. The demand for light rails is moderate, coming principally from coal mining interests. The inquiry for structural material is better. For bars there is some demand from jobbers. Track material continues in fair demand.

Old Material.—There is no improvement in the demand from consumers and the market is exceedingly dull. No railroad lists were offered the past week. While the market is nominally unchanged, concessions from prices quoted would have to be made to effect sales. We quote dealers' prices, per gross ton, f.o.b. St. Louis:

Old iron rails	$13.50 to $14.00
Old steel rails, rerolling	12.25 to 12.75
Old steel rails, less than 3 ft	11.00 to 11.50
Relaying rails, standard sections, subject to inspection	23.00 to 23.50
Old car wheels	12.50 to 13.00
Heavy melting steel scrap	11.00 to 11.50
Frogs, switches and guards, cut apart	11.00 to 11.50

The following quotations are per net ton:

Iron fish plates	$11.00 to $11.50
Iron car axles	17.00 to 17.50
Steel car axles	17.00 to 17.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.00 to 10.50
Railway springs	9.50 to 10.00
Locomotive tires, smooth	16.00 to 16.50
No. 1 dealers' forge	9.00 to 9.50
Mixed borings	4.50 to 5.00
No. 1 busheling	9.50 to 10.00
No. 1 boilers, cut to sheets and rings	8.00 to 8.50
No. 1 cast scrap	10.00 to 10.50
Stove plate and light cast scrap	8.50 to 9.00
Railroad Malleable	8.50 to 9.00
Agricultural malleable	7.50 to 8.00
Pipes and flues	8.00 to 8.50
Railroad sheet and tank scrap	7.50 to 8.00
Railroad grate bars	8.00 to 8.50
Machine shop turnings	6.50 to 7.00

Charles M. Day has been appointed to represent Hickman, Williams & Co.'s St. Louis office in the West and Southwest.

The Harry Benjamin Equipment Company, St. Louis, purchased at receiver's sale the entire equipment and property of the Covington & Southwestern (electric) Railway.

The Laclede Gas Light Company will erect an eight-story office building at the corner of Eleventh and Olive streets. The structure will have a frontage of 100 ft. on Olive and 107 ft. on Eleventh street. It is the intention of the company to occupy most of the building when completed.

San Francisco

SAN FRANCISCO, CAL., April 12, 1911.

Notwithstanding a fair activity in some lines the situation in general is by no means satisfactory. Sales of most finished products since the first of the year have been below normal, and the increase which usually occurs during the spring has been much smaller than was confidently expected. Many of the larger consuming interests have failed so far to place any important orders, while the small trade is operating on a hand-to-mouth scale and there is a general reluctance to carry any stock for future requirements. In a few lines, however, there is considerable activity. Some very fair orders are being placed for water works and gas systems, and extensive development work is being carried on by the leading railroads, which are planning for still greater improvements in the future. Building is active in all coast cities, with indications of further improvement during the summer.

Bars.—The distributive trade in soft steel bars is dragging at about the same rate as last month. The small buyers through the country are taking only limited quantities and the larger consumers buy very little in excess of current needs. Stocks in local warehouses are fairly large and merchants are buying in a very limited way of domestic mills. Some foreign bars are being ordered to arrive, but this business also is of comparatively small proportions. The principal demand is for reinforcing material, for which foreign bars are used to a large extent. An increasing business in this line is expected, as a number of large concrete buildings are being figured in San Francisco and other coast cities. There is less firmness as to prices than before, owing to pressure to sell on the part of local manufacturers of iron bars. Bars from store, San Francisco, are quoted at 2c. for steel and 1.90c. for iron.

Structural Material.—Permits were issued last month for buildings at a valuation of $2,090,703, making the best month's record since last July. The amount of class A construction, however, was very small, most of the work consisting of small brick and concrete structures. The total at Los Angeles is higher than in San Francisco, while the record of Oakland, Cal., was better than for any previous month except April last year. The situation at Portland, Ore., has been steadily improving since January, but building is rather quiet at Seattle, Wash. No local contracts of special interest have been awarded recently, but a considerable number of small orders are being taken by local shops, and figures will be taken shortly on some new municipal jobs. Eastern fabricators are showing little interest in municipal work in San Francisco, owing to the preference given to local shops. Several large steel buildings are talked of, but with a few exceptions the outlook is rather uncertain. A good demand for small work, however, is practically assured. The Southern California Edison Company, Los Angeles, is in the market for a lot of transmission towers. Reid Bros., local architects, are drawing plans for a 10-story bank building for Los Angeles. The Y. M. C. A. at Seattle, Wash., is planning an eight-story building, and the Pacific Tel. & Tel. Company is planning a large structure at Spokane, Wash. I. Gevurtz & Son, Portland, Ore., are having plans drawn for a large class A building at Fifth and Alder streets. Beams and channels, 3 to 15 in., from store, San Francisco, are quoted at 2.65c.

Rails.—Light rail business is coming out in good shape, though some merchants are getting less inquiry than usual at this season. The movement of standard sections on small orders is about normal and there are indications of an increasing tonnage. There is some buying for interurban and street railroads, but new developments in this line are slow to materialize. The transcontinental lines, however, are securing franchises and rights of way which are believed to be the first steps in a plan for general development. The Sacramento Electric, Gas & Railway Company is planning to lay new rails on several streets this year. The Mt. Tamalpais Railway Company is preparing to extend its scenic road from West Point to Bolinas Bay. Gasoline motor cars are to be used on the new line.

Sheets.—The general distributive business is very quiet, though a number of good contracts have recently been taken by local sheet metal works. Merchants are buying in a very small way. A considerable tonnage will be required for pipe work in various parts of the coast during the summer.

Plates.—There is very little movement in the jobbing trade, but the tonnage recently booked by mill representatives is better than for some time and a number of new inquiries are coming up. Several large penstock jobs are to be let shortly, one being for the new power and water project of Tacoma, Wash. The Sacramento Electric, Gas & Railway

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Company will erect a new gas holder, and a contract has been let for a gas tank at Petaluma, Cal. A new gas plant project has been started at Turlock, Cal. The Los Angeles Gas & Electric Company has let a contract to the Llewellyn Iron Works for a 65,000-barrel oil tank. The Standard Oil Company has secured a large tract of land near Los Angeles for the supposed purpose of building a new refinery. The Tacoma Gas Company will erect two tanks, with a total capacity of 1,000,000 cu. ft., and an increase in capacity is planned by the Spokane Gas Company.

Merchant Pipe.—Both merchants and mill representatives report business below normal. There is apparently some activity among the consuming trades and some improvement should appear before long, but at present there is a general tendency to keep supplies as small as possible. The movement to the oil fields continues light, the only notable inquiries having failed to produce any business. The National Tube Company has taken the municipal order for tubular trolley poles for the Geary street railroad.

Cast Iron Pipe.—The tonnage since the first of the month has been moderate, but small orders are fairly numerous and conditions are favorable for an active summer. Notable extensions are to be made to the gas systems of San Francisco and Los Angeles, as well as of several smaller towns. Many cities of the coast are making preliminary preparations for auxiliary systems for fire protection, though no business in this connection can be expected for some time. The water situation in San Francisco and Alameda County is unsettled, and competing corporations are giving more attention to sources of supply than to their distributing systems. Prices at Pacific Coast terminal points are $34 per net ton for 6 to 12 in., $35 for 4-in. and $1 extra for gas pipe.

Pig Iron.—The local foundry trade remains dull, though there is considerable activity around Los Angeles and at several north coast points. Prices stand about as before, No. 2 Southern foundry iron being nominally quoted at $21 to $22, while importers ask $23 for ordinary foundry grades of English, Continental and Chinese iron.

Old Material.—The demand for all classes of material is limited. The requirements of steel melting scrap on the coast have been smaller than was expected at the first of the year and the market is accordingly depressed, though a renewed demand is expected in the near future. Cast scrap receives little attention, but dealers have no large supplies on hand and the price is steadily maintained. Old rails and wrought scrap are quiet. Prices are quoted as follows: Cast iron scrap, per net ton, $18; steel melting scrap, per gross ton, $11 to $12; wrought scrap, per net ton, $12 to $15; re-rolling rails, per net ton, $15.

Birmingham

BIRMINGHAM, ALA., April 16, 1911.

Pig Iron.—The trading in this market the past week was very light, and but little tonnage was added to order books by the sales made through Northern and Eastern offices. It is not believed, however, that the inactivity of the past weeks has yet been reflected in the movement from furnace yards. No mention has been made of requests that shipments against contracts now in force be withheld, and the condition now existing in the market is attributed to the uncertainty of prices rather than to the condition of the foundry trade. As far as can be ascertained, the attitude of the producing interests as to commitments for deliveries for the last quarter of this year has not changed, notwithstanding the lack of sales at the figures asked. The basis of $11, Birmingham, is being freely quoted for third quarter shipments, with the exception of two concerns who refuse to accept any tonnage for shipment after July 1 at a lower price than $11.50 for No. 2 foundry, but such figures, though probably acceptable by certain concerns, are not yet quoted for the last quarter. For the small lots placed last week the $11 schedule was fully maintained, and no concessions from that basis are believed to be available except for high silicon iron, which can probably be had at a smaller premium over the No. 2 basis than had been asked. There has been no change in the asking prices for grades below No. 4 foundry, such grades being quoted at a differential of 25c. per ton on a No. 2 foundry schedule. The production of charcoal iron has been temporarily reduced by the blowing out of one furnace for repairs.

Cast Iron Pipe.—A contract for 5000 tons of water pipe for the city of Helena, Mont., is to be placed the coming week. An aggregate of some 1500 tons in comparatively small lots is also to be placed at an early date and the five miles mentioned in last report is still pending. With the placing of this tonnage it is believed that the plants now running will be well supplied with orders, and that higher prices than those now asked will be realized, notwithstanding the unchanged prices of raw material. It is noted that the output in this district is still represented only by the operations of the United States and the American companies, with the dates for the resumption of operations at idle plants still undetermined. This fact alone has probably had more effect on the asking prices than any other feature connected with the market. With the volume of business in sight very satisfactory, we quote this market firm at the following prices, per net ton, f.o.b. cars here: 4 to 6 in., $23; 8 to 12 in., $22; over 12 in., average $21, with $1 per ton extra for gas pipe.

Old Material.—Considerably more interest was manifested in this market the past week than for some weeks previous, and the sales that were made were of such a nature as to afford to some extent a test of dealers' prices. The movement from the yards was confined largely to certain grades, but as the largest accumulations were affected it is believed that the market is considerably firmer as a result. We revise dealers' selling quotations as follows, per gross ton, f.o.b. cars here:

Old iron axles (light)	$14.50 to $15.00
Old steel axles (light)	13.50 to 14.00
Old iron rails	13.00 to 13.50
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	10.50 to 11.00
No. 1 country wrought	8.00 to 8.50
No. 2 country wrought	7.50 to 8.00
No. 1 machinery	10.50 to 11.00
No. 1 steel	9.50 to 10.00
Tram car wheels	9.00 to 9.50
Standard car wheels	10.50 to 11.00
Light cast and stove plate	8.00 to 8.50

The Hammond-Byrd Company of this city, dealer in pig iron, coal, coke and cast iron pipe, has opened an office at Chicago, Ill., with Chas. W. Badger, resident manager, which is temporarily located at 428 Ashland Block, and will after May 1 be located in the First National Bank Building. This company has also opened an office at San Francisco, Cal., in charge of C. H. Stanyan as resident manager.

The German Iron Market

BERLIN, April 6, 1911.

The iron market situation still remains involved in considerable uncertainty, but the general tendency appears to have grown somewhat better, notwithstanding evidence that points apparently to the contrary conclusion. Thus the latest reports agree in saying that the bar market has latterly undergone a considerable improvement, so far as the amount of business done is concerned. For some time after the negotiations for the prolongation of the convention failed the market remained in a state of uncertainty regarding the probable effect of this event upon prices, and the tendency with consumers and dealers was to wait to see whether they might not be able to get better terms later on. Prices did break, indeed, but not so severely, at least for the home market, as had been anticipated; and now buyers are appearing in the market in considerably greater numbers.

Steel Bar Prices Lower

After the failure to renew the bar convention the mills of the southwestern district made an agreement not to sell below 105 marks; and this appears also to be about the price of the mills of the Steel Works Union in the Rhenish-Westphalian district, but it is asserted that bars can be bought at some establishments, even for the home market, at as low as 100 marks. For export the price free on board at Antwerp was as low as 94 marks, and even 92 marks, till about the end of March, but it is doubtful whether such low prices are now conceded, inasmuch as the export drawback expired with the expiration of the convention at the first of this month. This cessation of the drawback is likely to relieve outside markets of the pressure of German bars to some extent; it is supposed that this fact explains a firmer tendency in the Belgian bar market, with a slight increase in the export price. Belgian works have also just added 3 shillings to the price of beams for the English market.

The latter specialty and other structural shapes appear at length to be finding a readier market at home, the building season having at last opened up with considerable vigor. Specifications have been coming in much more briskly, and new ordering has been considerably more active since the Union adopted unchanged prices several weeks ago. A better export demand for this and some other specialties is reported. The Union continues to get foreign business in rails. Plates, both heavy and thinner qualities, are reported to be doing better. In band iron prices have been disturbed by mills outside of the trade combination and have dropped to 135 marks; the mills also have only light home orders, and have, therefore, been competing sharply for foreign or-

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ders. They have beaten down prices abroad and even then find it difficult to get orders.

The Pig Iron Outlook

The pig iron trade is quiet. Buyers are in some cases trying to get in orders for 1912 delivery, but the furnaces are rejecting these, as they are disposed to await the result of the negotiations for prolonging the Essen Syndicate. It has been conferring again with the Siegen furnaces with regard to joining, but no apparent result can as yet be reported. The East German Pig Iron Syndicate has just been prolonged to the end of 1914. It seems probable that an effort will be made to effect an advance of prices along with the renewal of the Essen Syndicate, which lapses at the end of June. Whether such a rise can be carried through seems doubtful. A motion was made at a meeting of the syndicate a fortnight ago to raise prices at once, but it was voted down.

It seems probable that the production of pig iron will continue to expand. The Norddeutsche Hütte, which has been building blast furnaces near Bremen for several years, put them into blast this week. It has its own coke ovens; they were put into operation three weeks ago. Other concerns are building furnaces. It is reported that the Gutehoffnungs Hütte, one of the greatest establishments on the Lower Rhine, has bought an extensive site at Diedenhofen, Lorraine, with a view to erecting a large furnace and steel plant. It owns very high grade ore properties in the vicinity. It is also reported that Belgian furnaces at Longwy are about to establish a great furnace plant at the mouth of the Scheldt, below Antwerp; for the present they will build coke ovens, expecting to run them on English and German coal.

More Consolidations

An important consolidation of companies has just been announced. The Eisenwerk Kraft, situated near Stettin, is to absorb the Niederrheinische Hütte, which operates four furnaces at Duisburg, at the mouth of the Ruhr. Both are owned chiefly by Prince Henckel von Donnersmarck. The Duisburg concern has been renovating its furnaces for several years and bringing them up to modern standards, and it owns extensive ore properties in the Nassau and Rhine districts. There have been various rumors in circulation that it would also build a complete steel plant, with rolling mills, and that it was about to buy a coal mine in addition.

Another fusion of considerable importance, that of the Sieg-Rheinische Hütte with the well-known Fassoneisen-Walzwerk Mannstaedt, was announced to-day. The Mannstaedt concern, with a present capital of 5,500,000 marks, will raise it to 10,000,000 marks, and will remove its whole plant to Friedrichs-Wilhelm-Hütte, on the Sieg River, not far from the Rhine. Mannsteadt will also build an open hearth steel plant in order to render itself independent of the Union for its steel supply. The managers hope in this way to reduce the costs of production, and thereby to push their foreign trade more successfully. The furnace company acquired owns one completed furnace and another partly finished. The latter will at once be completed and put into blast. Both furnaces will be equipped with appliances for saving the gas, which will create the power for the rolling mills. The Mannstaedt Company is well known in many foreign markets for its shaped bars of various profiles.

Negotiations for the prolongation of the German cast iron pipe syndicate have failed, and the combination has been dissolved.

The railroad authorities are asking for bids for nearly 500 locomotives, all to be delivered by the end of next March. This will bring much work to the machine shops.

New York

NEW YORK, April 19, 1911.

Pig Iron.—A fair amount of business is being placed, but most of it is in moderate lots, and there is considerably more inquiry than buying. One important interest is in the market for 4750 tons of five different kinds of analysis iron, deliveries beginning in June and extending into the last quarter. An electrical interest is still inquiring for 2200 tons, and there is further New York State business pending. In New Jersey are a number of inquiries, in the main for lots of 500 and 1000 tons, deliveries for the most part in the last half. A recent inquiry for 1000 tons for a boiler works foundry has been withdrawn. Of the tonnage recently under negotiation for a sanitary pipe interest, 2000 tons is believed to have been bought for New Jersey delivery, while a smaller amount was taken for a New York State plant. Prices have changed but little, but furnaces have not realized their expectations in the matter of advances over the current market price for deliveries in the second half of the year. Ore prices are more of a factor than in recent weeks. Some foreign ores are now available at a concession from the basis maintained two months ago, prices lately reported being midway between those of 1909 and 1910. The maintenance of the 1910 basis on both Lake Superior ores and on Eastern ores is considered less likely as the season of navigation approaches. Shipments of some Eastern ores have kept up well, one interest's shipments in the first three months of this year being 94 per cent. of those in the first quarter of 1910. We quote pig iron for early shipment as follows, at tidewater: Northern No. 1 foundry, $15.75 to $16; No. 2 X, $15.50 to $15.75; No. 2 plain, $15.25 to $15.50; Southern No. 1 foundry, $15.50 to $16; No. 2, $15.25 to $15.50.

Ferroalloys.—An Ohio steel interest has purchased 1000 tons of ferromanganese for delivery over the next four months at a price about $36.50, Baltimore. Another Ohio steel interest has purchased 500 tons for early delivery. Inquiries are now few and the ferromanganese market is quite weak. It is certain that $36.50 is the top price at seaboard at present. Ferrosilicon is neglected in the New York market, and the usual quotation is between $53 and $54, Pittsburgh.

Steel Rails.—The Maryland Steel Company is reported to have taken 8000 tons of the 14,000 tons placed by the Missouri, Kansas & Texas, shipment to be made by water to Gulf port. The Pennsylvania Steel Company has sold 1800 tons to the Cambria Construction Company. For the Chicago City Railways an inquiry has come out for 1250 tons of girder rails.

Finished Iron and Steel.—Present low prices for fabricating have brought out considerable business in structural material, but otherwise the finished lines are very quiet. Deliveries are so good that plates are ordered only as needed, and practically no stock is carried by the consumers. The steel bar trade expects to hear from the implement makers in about a month, but new inquiry is still very light and specifications are poor. Only a fair tonnage of bar iron orders is being received. Except for plates of the narrower sizes, however, prices are all firm. The principal event in the structural field was the asking of a pound price on 80,000 tons for the Interborough Rapid Transit Company of this city. Bids will close April 24, and deliveries are to begin in three months and extend through two years. The erecting is to be done by the purchaser. The material is wanted for general improvements on the Manhattan elevated lines, including additional tracks for express service on the Second, Third and Ninth avenue lines and extensions on these, as well as the Sixth avenue line. A double-deck bridge over the Harlem River is also included. Plans were issued April 18 on the 14-story Essex County National Bank Building, Newark, N. J., and are expected to be out this week on the Bamberger store in the same city. Those for the Woolworth Building are also expected to be out shortly, but reports that the fabricator has been decided on are premature. The general contract for the Insurance Exchange Building, on Maiden Lane, New York City, has been awarded the Thompson-Starrett Company, and the American Bridge Company will furnish the 8000 tons of steel. The McClintic-Marshall Construction Company has taken between 1500 and 1600 tons of bridge material for the Atlantic Coast Line, and the Cambria Steel Company has the award of the 1200 tons for the boiler house for the American Sugar Refinery Company in Boston. The Eastern Steel Company has 350 tons for the Keystone Theatre in Philadelphia, and the National Bridge Company 225 tons for the School of the Ascension in New York. Bids are in, but no awards have yet been made, on the following: Norfolk Terminal Railway Company's station, Norfolk, Va., 1200 tons; loft for the Haviland Company on East Thirty-sixth street, New York, 1500 tons; Barge Office, New York, 1000 tons; Henry Heide candy factory, New York, 2200 to 2300 tons; building for Black, Starr & Frost on Fifth avenue, New York, 1000 tons; 12-story loft for the Fabian Construction Company, West Twenty-sixth street, New York, 1800 tons, and 12-story loft for the Stone Construction Company on West Thirty-fifth street, New York, 800 tons. Other inquiries in the market are for 5000 tons for the Northwestern Mutual Life Insurance Company's building, Chicago, and 2000 tons for the Fidelity Insurance Company's building, and 1500 tons for the Marshall Field warehouse in the same city. Bids will close May 1 on 600 to 1200 tons of plates for four, six or eight barges for Missouri River service asked by the United States Army Engineer Office. Quotations remain unchanged: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.40c. to 1.45c., all New York. Plain material and plates from store, New York, 1.85c. to 1.95c.

Cast Iron Pipe.—The dullness in the cast iron pipe trade is emphasized by the fact that the most important public letting now in sight in this section of the country is that of Presque Isle, Maine, 385 tons, April 25. A number of other lettings have been announced, but all are for small

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quantities. The general demand from private consumers is exceedingly light. Prices continue to range from $21 to $22 per net ton, tidewater, for carload lots of 6-in. L. A. Thornton, city engineer, Regina, Saskatchewan, Canada, will receive bids up to noon April 26 for 900 tons of 18-in. and 150 tons of 6-in. water pipe.

Old Material.—Conditions in this branch of trade have seldom been worse. The only transactions have been purchases of small lots of heavy melting steel scrap by dealers who have contracts yet to fill. Rejections continue to be made by steel companies and rolling mills. In numerous instances the material thus rejected has been sacrificed in preference to paying freight back to the dealers' yards. Prices thus realized have been much lower than any hitherto reported. The railroad offerings closed in the past week were sold largely to dealers, but the condition of the market prevents them from giving shipping instructions, and it may be some time until the material is moved. Dealers' quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting	$10.00 to $10.50
Heavy melting steel scrap	10.00 to 10.50
Relaying rails	20.00 to 21.00
Standard hammered iron car axles	21.50 to 22.00
Old steel car axles	16.00 to 16.50
No. 1 railroad wrought	12.50 to 13.00
Wrought iron track scrap	12.00 to 12.50
No. 1 yard wrought, long	11.50 to 12.00
No. 1 yard wrought, short	10.00 to 10.50
Light iron	5.00 to 5.50
Cast borings	5.00 to 5.50
Wrought turnings	5.50 to 6.00
Wrought pipe	10.25 to 10.75
Old car wheels	11.50 to 12.00
No. 1 heavy cast, broken up	11.00 to 11.50
Stove plate	8.50 to 9.00
Locomotive grate bars	9.00 to 9.50
Malleable cast	10.00 to 10.50

Metal Market

NEW YORK, April 19, 1911.

THE WEEK'S PRICES

Cents Per Pound for Early Delivery.

	Copper, New York.			Lead.		Spelter.	
April.	Lake.	Electrolytic.	Tin. New York.	New York.	St. Louis.	New York.	St. Louis.
13	12.37½	12.12½	42.15	4.45	4.30	5.50	5.30
14	12.37½	12.12½	42.15	4.45	4.30	5.50	5.30
15	12.37½	12.12½	42.15	4.45	4.30	5.50	5.30
17	12.37½	12.12½	42.10	4.45	4.30	5.50	5.30
18	12.37½	12.12½	41.95	4.45	4.30	5.50	5.30
19	12.37½	12.12½	41.70	4.45	4.30	5.50	5.30

Spot pig tin is still selling below the cost of future importation and has declined below last week's price. While electrolytic copper has been sold at 12c., the market is now stronger. Lead is dull and softer. Spelter is quiet, but unchanged. Antimony has been active at lower prices.

Copper.—Consumers' inquiries indicate that some of them are in need of stock, but they are holding out for 12c. electrolytic. Their attitude in this direction has been influenced by some heavy sales of outside lots of electrolytic at that price, as within the last week fully 500,000 lb. of speculative copper was offered at resale and promptly taken These offerings of outside lots influenced prospective purchasers, who were unable to get their orders taken at that price, and they promptly withdrew their inquiries. As the matter stands now there is a deadlock between sellers and buyers. With the speculative offerings out of the way dealers feel that they should be able to get 12.12½c., and they declare their intention of holding out for it. Lake copper is fairly firm at 12.37½c., although some sales have been made below that price. A good sized lot was sold in Buffalo at about 12.15c., but this transaction was made by a holder who was anxious to obtain some ready money. In London to-day the market closed steady, with spot selling at £53 11s. 3d. and futures at £54 3s. 9d. The sales amounted to 700 tons of spot and 300 tons of futures.

Pig Tin.—The pig tin market is dull, but all things considered the situation is better from the consumers' standpoint than it has been in many weeks. The closing of the London market last Thursday afternoon for the Easter holidays left this market to its own guidance until yesterday morning, and consequently pig tin for the first time in many months remained at one price for a period of three business days. There is a good quantity of spot tin available in this country, but consumers seem to be fairly well supplied, and they refuse to take hold, regardless of the fact that this market is at present considerably below the import parity. The reopening of the London market yesterday had little effect on the situation beyond causing a 5-point drop in the American price. In New York to-day pig tin was sold for 41.70c. The London market closed steady, with spot tin selling at £191 15s. and futures at £187. The sales amounted to 220 tons of spot and 390 tons of futures.

Tin Plates.—Tin plates are quieter, and about the only call from consumers comes from the can manufacturing interests. Quotations are unchanged at $3.94 for 100-lb. coke plates.

Lead.—Lead is dull and neglected. Although the nominal price is unchanged, the market is somewhat softer than it was a week ago. The usual quotations are 4.45c., New York, and 4.30c., St. Louis.

Spelter.—It is hard to tell the actual price of spelter, as there are many dealers who are anxious to dispose of their holdings and reports of price cutting are prevalent. Consumers are not inclined to make purchases at prevailing quotations, and the market is so disorganized that they have very little faith in the situation. Some sellers are very firm in their demands and are holding out for 5.50c. for spot in New York and 5.30c., St. Louis. It is pretty certain that by shopping about consumers could get better terms.

Antimony.—While the foreign syndicate of antimony producers seems to be fairly successful in maintaining the combination that has been effected, antimony is weak in this country. This is due to the fact that stocks are very plentiful, and as the agents here for European houses are very firm in their demands most consumers are filling their wants elsewhere. There has been a good deal of trading, much of it of a speculative nature among dealers, and this has brought out the fact that many people are over stocked with some of the best known brands. Hallett's can now be had for 8.75c., although some sellers are quoting 9c. Cookson's is firm at 9.50c., which is largely due to the fact that most of the available antimony of that brand is in the hands of authorized representatives of the producers here. The Chinese and Hungarian grades are freely offered at prices from 8.25c. up. Just now all grades of antimony can be bought at resale at a lower price than it would cost to import the metal into this country.

Old Metals.—Continued dullness is reported by dealers, whose selling quotations are unchanged as follows:

	Cents.
Copper, heavy cut and crucible	11.75 to 12.00
Copper, heavy and wire	11.50 to 11.75
Copper, light and bottoms	10.75 to 11.00
Brass, heavy	8.00 to 8.25
Brass, light	6.75 to 7.00
Heavy machine composition	10.50 to 10.75
Composition turnings	8.75 to 9.00
Clean brass turnings	7.75 to 8.00
Lead, heavy	4.20 to 4.25
Lead, tea	3.95 to 4.00
Zinc scrap	4.25 to 4.30

Metals, Chicago, April 18.—There is a considerable volume of copper being sold in small spot orders. Spelter shows a decline of 5 points from last week, with the demand from consumers only moderately active. The price of tin receded ¼c. during the week. We quote Chicago prices as follows: Casting copper, 12½c.; lake, 12⅝c., in carloads, for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 42⅝c.; small lots, 45c.; lead, desilverized, 4.35c. to 4.40c., for 50-ton lots; corroding, 4.60c. to 4.65c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.35c. to 5.40c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c., in small lots; sheet zinc is $7.25, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12¼c.; copper bottoms, 10¼c.; copper clips, 12c.; red brass, 10½c.; yellow brass, 9c.; lead pipe, 4⅜c.; zinc, 4¼c.; pewter, No. 1, 27c.; tin foil, 32c.; block tin pipe, 35c.

Metals, St. Louis, April 17.—Lead is quiet at 4.30c.; spelter is steadier at 5.30c., both at East St. Louis. Zinc ore is firmer and held at $36 to $39 per ton, Joplin base. Tin is easier at 42.30c.; antimony (Cookson's) unchanged at 9.85c.; copper is lower, lake quoted at 12.72½c. and electrolytic at 12.47½c., all at St. Louis. The demand for finished metals the past week was only fairly good.

Notes on Prices

Rope.—Some manufacturers report a slight improvement in the demand, while others say that business is about the same as for some time. The prices of the lower grades of sisal rope are somewhat irregular. The following quotations represent regular prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure manila of the highest grade, 8½c. to 9c. per pound; second grade manila, 7½c. to 8c. per pound; hardware grade, 7c. to 7½c. per pound; pure sisal of the highest grade, 6½c. per pound; second grade, 6c. per pound; rove jute rope, ¼-in. and up. No. 1, 6½c. to 7c. per pound; No. 2, 6c. to 6¼c. per pound.

Linseed Oil.—Dullness is pronounced. The market in England is higher than it is here, owing to a better demand, so that if there was even a moderate activity here prices would probably be advanced. New York prices for carload lots are about 87c. to 88c. for domestic and 83c. for foreign

oil. The following are New York prices in 5-barrel lots or more:

	Cents.
State, raw	91
City, raw	91

Oil in lots of less than 5 bbl., 1 cent advance per gallon.
Boiled oil, 1 cent advance per gallon over raw.

Naval Stores.—Turpentine has continued to decline, following a similar condition in the Savannah market, and buyers are holding off for still lower prices. New York turpentine quotations in 5-barrel lots are as follows:

	Cents.
In oil barrels	76½
In machine barrels	77

Less than 5-bbl. lots, ½ cent advance per gallon.

Rosins have remained steady, with a light demand. On the basis of 280 lb. to the barrel, common to good strained is quoted at $8.15 and grade D at $8.30 in the New York market.

Iron and Industrial Stocks

NEW YORK, April 19, 1911.

Transactions in stocks the past week were not only light, in accordance with the continuance of dull conditions, but were further reduced by two holidays. The tendency was downward, but the declines were not serious. Steel Foundries was a notable exception, rising sharply from its recent decline. The range of active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., com..	7⅝- 7⅛	Pressed St., pref..	98½- 99
Allis-Chalm., pref..	28½- 29	Railway Spr., com....	32¼
Beth. Steel, com...	32¾- 33	Railway Spr., pref....	99½
Beth. Steel, pref...	61 - 63	Republic, com.....	32
Can, com.....	9½ 10	Sloss, com.....	51¾- 52⅛
Can, pref.....	82 - 83½	Sloss, pref.....	112
Car & Fdry, com..	51½- 52½	Pipe, com.....	16½- 17½
Car & Fdry, pref..	114⅞-116	Pipe, pref.....	55¾- 57
Steel Foundries....	41½- 45	U. S. Steel, com...	74⅝- 77⅛
Colorado Fuel....	29 - 30½	U. S. Steel, pref...	119 -120
General Electric...	150 -150½	Westinghouse Elec.	65½- 66
Gr. N. ore cert....	60¼- 62	Am. Ship, com....	72 - 73
Int. Harv., com...	115½-115⅝	Chi. Pneu. Tool...	51 - 52½
Int. Harv., pref.....	124½	Cambria Steel....	45 - 46⅞
Int. Pump, com....	38½- 39½	Lake Sup. Corp...	28 - 28¼
Int. Pump, pref.....	89	Pa. Steel, pref.....	108
Locomotive, com..	36 - 37¼	Warwick	11
Locomotive, pref..	104 -105½	Crucible St., com..	12½- 12¾
Pitts. Steel, pref..	103 -104	Crucible St., pref..	77½- 78½
Pressed St., com..	31¾- 32	Harb.-W. Ref., com....	42

Dividends.—The American Steel Foundries has declared the regular quarterly dividend of 1¼ per cent., payable May 15.

The Warwick Iron & Steel Company, Pottstown, Pa., has declared a semi-annual dividend of 4 per cent.

The Ellwood City Iron & Wire Company, Ellwood City, Pa., manufacturer of fire escapes, railings, iron stairs, &c., has recently erected a brick addition to its factory, doubling the floor space and enabling work to be handled to better advantage. No additional equipment will be required for the present. A. D. Pander is president and manager.

At the monthly meeting of the Engineers' Society of Western Pennsylvania held in its headquarters in the Oliver Building, Pittsburgh, on the evening of April 18, Dr. Joseph W. Richards of Lehigh University, South Bethlehem, Pa., presented a paper on "The Electrometallurgical Revolution in the Iron and Steel Industry of Norway and Sweden."

The entire plant of the Allegheny Steel Company, Brackenridge, Pa., embracing open hearth steel works, plate and sheet mills, boiler tube mill and other steel specialty departments, is in full operation, with a fair amount of work ahead. The company reports that more actual orders are being placed than for some time.

The United States Cast Iron Pipe & Foundry Company has moved its Chicago office from the Rookery Building, where it has been located for many years, to the People's Gas Building, Rooms 923-927, where much more desirable quarters have been engaged.

Federal Furnace A, at South Chicago, went out of blast April 15. Furnace No. 3 of the Illinois Steel Company's plant, at South Chicago, is temporarily out of blast as the result of an accident, but will resume operations within a week.

The Crucible Steel Company of America

Chairman Herbert Du Puy of the Crucible Steel Company of America states that at a meeting of the Board of Directors, held in Pittsburgh on Monday, April 17, the report of the treasurer was presented showing that the operating profits for the month of March, 1911, were $335,722.47, or more than $100,000 in excess of what had been unofficially stated in the public prints earlier in the month.

Mr. Du Puy further states that though the domestic business of the company, in sympathy with general conditions, is not holding up quite as well as it did last year, at the same time, to equalize this, efforts have been made to push for foreign trade, so that in dull periods, when there is a shrinkage in orders at home, this shortage can be made up through an increase from foreign countries. He states that the company is now considering the advisability of arranging an official connection with a house in Austria and the establishment of a branch in South Africa, so as to cover additional foreign territory to that which it already covers. The management feel it incumbent upon them to vigorously push the introduction of their products into foreign lands where the demand for the higher grades of crucible steels are constantly increasing, and where, owing to the superiority of the products of the company, the market shows encouraging conditions.

President Dougherty of the Pittsburgh Crucible Steel Company is maturing his plans for the development of the new works at Midland, Pa., and expects in a few days to submit figures covering the first installation of improvements to be made there. Within 12 months it is confidently expected that the company's coal property which was recently bought and at least the open hearth furnace improvements to be built at Midland will all be in full practical operation. Great results are confidently looked for after these installations are completed.

Trade Publications

Molding Machines.—The Union Foundry & Machine Company, Pittsburgh, Pa. Catalogue A. Concerned with the Lawlor improved jarring molding machine and also a movable combined jarring and squeezing machine. The former is capable of handling very large work and the latter can be utilized for very small work. Both machines are illustrated and a brief table of the sizes in which the jarring machine is made is included.

Telephone Material.—W. N. Matthews & Brothers, St. Louis, Mo. Loose leaf book. Size, 4 x 6½ in.; pages, 236. This is the third edition of a book on telephone line construction and contains considerable information and data on overhead and underground telephone construction work. The various specialties made by this company are all illustrated and described, and in addition there are instructions and diagrams for making the customary tests.

Vanadium Steel.—American Vanadium Company, Frick Building, Pittsburgh, Pa. Three pamphlets. Two of these deal with the various kinds of automobile and spring steels which this company is prepared to furnish and contain data on the properties of the various types. The third pamphlet contains 64 pages, and after a brief historical introduction, gives a classification of the different kinds of vanadium steel, together with the proper methods of heat treatment. A list of the various applications together with the type and the treatment recommended for each case is included, together with directions for the application of vanadium to steel and iron.

The James Lappan Mfg. Company, Pittsburgh, builder of heavy steel plate work, has received a contract for the piping work and the replacing of dust catchers and down comers at the Edith Furnace of the American Steel & Wire Company, located at Pittsburgh. This furnace is to be entirely rebuilt.

The Alan Wood Iron & Steel Company was the highest bidder for the Panama scrap sold at Philadelphia on Tuesday, its bid being $10.11 per ton.

The Central Tube Company of Pittsburgh, works at Leatsdale, Pa., has increased its capital stock from $350,000 to $500,000.

Electric Furnaces of the Induction Type*

Electrical and Metallurgical Features, with a Summary of Costs

BY C. F. ELWELL, PALO ALTO, CAL.

Electrical Features

The furnaces for the refining of steel electrically, which have passed the experimental stage, may be divided into two distinct groups—namely, are furnaces and induction furnaces. To the former belong the Heroult, Stassano, Keller and Girod furnaces, and to the latter the Kjellin and Röchling-Rodenhauser furnaces. Of the former the Heroult Furnace is perhaps the best known and most successful, and as comparison always carries more weight than a description it will be used as the representative of the arc furnaces. The electrical features may be divided up under several heads.

DISTRIBUTION OF HEATING EFFECT OF THE CURRENT.

Arc Furnaces.—In the Heroult Furnace the current passes from one electrode through an arc to the slag, through the slag to the upper metal, and thence through another arc to another electrode; and of the current which passes through the carbons only a small percentage passes through part of the metal. As the heating effect of the arc is far greater than any effect of the resistance of the charge, there must be large differences of temperature between different parts of the bath of metal, even in spite of the great activity of the bath around the electrodes. This is especially the case with a deep bath of metal. It is for this reason that Girod employs a bottom electrode, thinking thus to have these differences of temperature less by passing all the current for the arcs through the bath. From figures given in *Stahl und Eisen* for a 2-ton Girod Furnace, it was computed that the resistance of the carbon electrode was 3800 times that of the bath of metal and so 3800 times more electrical energy was converted into heat in the carbon electrode than in the bath itself. From this it is seen that if the current in the bath of metal produces any considerable part of the heat of the furnace, there must be a large loss of energy in the carbon electrode. The only correction for this is to make the electrodes larger, and the working limit has already been reached. The fact is that the bath is very little heated by the passage of the current and almost all the heating in this type of furnace is done by the very localized heating of the arc. The matter of the losses of energy in the carbons will be taken up under the heading of efficiency.

Induction Furnaces.—The principle of the induction furnace is already well known, but in order to compare the Kjellin and Röchling-Rodenhauser types it will be well to repeat briefly the principle of operation and the type of construction of the Kjellin type. The furnace consists essentially of an iron core around one leg of which is wound a primary winding inclosed in a refractory case and usually cooled by means of forced draft. The annular hearth surrounds this primary coil, and is separated from it by means of refractory material. This hearth contains the metal and acts as a secondary winding of one turn. The voltage induced in this turn is quite small, so that the energy transformed from the primary coil results in a very large current in the secondary, which heats the metal and thus nearly all the electrical energy is converted into heat in the metal to be melted. The ring being of constant cross section, the heating is about uniform over the whole bath of metal. The Röchling-Rodenhauser Furnace, which has a differently shaped hearth, is constructed either for single or three-phase current. In the former case there are two grooves, and in the latter three grooves. In both cases these grooves, which are similar to the grooves in the Kjellin Furnace, open into a distinct open hearth. The cross section of the grooves is comparatively small, and they form the secondary circuits in which the currents which heat the metal are induced. Lateral doors are provided so that the contents of the working chamber may be watched, slag drawn off or charge put in. The chief electrical difference between the Röchling-Rodenhauser and Kjellin Furnace is that a distinct secondary winding is provided in the former, and the current induced is led by means of heavy terminals to plates embedded in the refractory material of the furnace. This refractory material becomes an electrical conductor at the higher temperatures, and this enables an additional circuit to be formed, so that the currents induced in the secondary winding pass through the bath of metal, heating the bath still further. The current also serves to neutralize the great self-induction of the secondary, and a better power factor is obtained. The point to be recognized here is that the heating is uniform and not localized as in the Heroult Furnace.

VARIATION OF LOAD ON SUPPLY MAINS.

Arc Furnace.—The instability of an arc is well known, and the load on a supply circuit, even with constant watching, varies very greatly. If the furnace has its own generator the regulation can be effected more simply, but the best furnace is one which can be connected to regular three-phase supply mains. To do so with the Heroult Furnace means motor driven electrode regulators, &c., and even then the furnace is not a very desirable load.

Induction Furnaces.—The changes in load on an induction furnace are always of the international kind and sudden changes of load are practically impossible with an induction furnace.

ADAPTABILITY TO CONNECTION TO SUPPLY MAINS.

In the question of power factor the Heroult Furnace shows some advantage over the Kjellin Furnace, for in order to build a Kjellin Furnace of 8-ton capacity and keep the power factor up to 0.6 or 0.7 it was necessary to lower the frequency to five periods per second. As a five-cycle generator costs more than twice as much as a 25-cycle generator this is a serious question. But with the Röchling-Rodenhauser Furnace the current in the second secondary winding can be used to neutralize the effect of self-induction to such an extent that a 7-ton furnace may be operated with 25 cycles with a power factor of 0.6, while a 3-ton furnace on 25 cycles has a power factor of 0.8. The smaller Röchling-Rodenhauser Furnaces are operated from 50 cycles with power factors of 0.85 and 0.8. In my opinion the most economical way to correct this evil is by using fixed condensers which cost only a small percentage of the cost of the furnace and the power factor may be made as high as desired.

ELECTRICAL EFFICIENCY.

Arc Furnaces.—The before mentioned Girod Furnace with but one electrode of 14 in. (35.5 cm.) diameter and a current of 6200 amperes at 60 volts showed a power loss of 10 per cent. in the electrode alone. In the Heroult Furnace the current is in general smaller, but there are two electrodes in series, and the result is about the same. Not only is energy lost in the electrodes by reason of their high resistance, but a large amount is also lost by means of the water cooling of the jackets, which is necessary because of their high conductivity for heat. The cost of maintenance of carbon electrodes is also considerable. Radiation loss is greater with the arc furnaces because a great deal of the heat of the arc is reflected to the roof, which must be water cooled to last, and even then has to be renewed about every 14 days.

Induction Furnaces.—Tests made on a 3.5-ton furnace at Volklingen have shown an electrical efficiency of 97 per cent., which is a contrast to the 10 per cent. lost in electrodes alone in arc furnaces. The electrode plates never wear out for they do not come in contact with the molten metal or slag, and the portion of the lining which

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acts as a conductor has been found in practice to last longer than any other portion of the lining.

SUMMARY OF ELECTRICAL FEATURES.

a. Heating of metal bath is much more uniform in induction furnace.

b. The variation of load is much less with the induction furnace.

c. The adaptability to connection to existing power networks is in favor of the induction furnace.

d. The efficiency is in favor of the induction furnace.

Metallurgical Features

The earlier induction furnaces, *i. e.*, those of the Kjellin type, did not show many metallurgical advantages except that it was possible to treat much larger charges than with crucible methods. They were quite unsuited to working with slag because of the shape of the hearth, and so only served to melt pure materials. The shape of the Röchling-Rodenhauser Furnace is such that slags can readily be handled and refining carried on. At the same time it can be used for smelting work whenever necessary, and as much larger charges can be worked, a considerable saving is made in crucible steel working. The advantages of the electric furnace are:

1. On account of the convenient regulation of the temperature attainable the phosphorus can be removed until only a trace remains.

2. It is especially suitable for the most thorough desulphurization.

3. When the refining is complete, the charge can be left in the furnace as long as may be desired without change of composition.

At Trollhattan, Sweden, the furnace is started by means of a ring of metal. The cold materials are charged gradually until all are melted. Continuous operation is possible by leaving a portion of the molten metal in the furnace after each teeming. At Volklingen, Germany, the furnaces are supplied with molten metal from basic Bessemer converters, which contains about 0.08 per cent. S and 0.08 per cent. P. The extent of the dephosphorization and desulphurization depends on what the steel is wanted for.

An oxidizing slag is formed from lime and mill scale or ore, which is removed, as far as possible, when dephosphorization is complete. The recarburization takes place and a slag free from iron is formed for desulphurization. A typical slag for desulphurization has a well-known white appearance and falls to a white powder on exposure to the air. When the slag has this property the charge may be left as long as desired in the furnace. The furnaces are entirely emptied after each charge, as the molten converter steel allows the load to be readily brought to a satisfactory figure.

When not working about one-third of the normal energy will keep the furnace hot. The 7-ton furnace at Volklingen has been 30 hours without taking any current and was heated up again with normal energy consumption. Within half an hour the metal began to glow and regained its normal temperature after 4 hours and the charge was finished up in the regular way. At the works at Volklingen no work is done on Sunday, but there is no difficulty in starting up the furnaces with unfinished charges from the previous Saturday.

The natural circulation which takes place in induction furnaces serves to thoroughly mix the charge, and the management of the Poldihütte, Austria, made a test in which seven samples were taken from six different places in the furnace and the analysis of these samples is shown in the following table:

	Carbon. Per cent.	Manganese. Per cent.	Silicon. Per cent.	Phosphorus. Per cent.	Sulphur. Per cent.	Chrom. Per ct.
1	0.81	0.27	0.335	0.031	0.007	1.00 1.01
2	0.77	0.25	0.340	0.030	0.008	1.00 1.01
3	0.85	0.28	0.345	0.029	0.007	1.00 1.01
4	0.82	0.27	0.335	0.030	0.009	0.98 0.99
5	0.78	0.25	0.335	0.030	0.009	0.99 0.96
6	0.78	0.27	0.419	0.031	0.010	0.99
7	0.79	0.28	0.326	0.030	0.009	0.98

The furnace was teemed 37 minutes later, and a sample cast-out of the ladle gave the following analysis:

	Per cent.
Carbon	0.77
Manganese	0.29
Silicon	0.396
Phosphorus	0.031
Sulphur	0.009
Chromium	0.99

That the Röchling-Rodenhauser Furnace is no longer an experiment is shown by the fact that the 3.5-ton furnace was worked for a whole year producing steel for rails, and more than 5000 tons have been sold. The 8-ton furnace has been running since November, 1908, an average of 14 days to a lining and 1200 tons of rails to a lining. The management contemplates the building of a 16-ton furnace as the next step. At Dommeldingen the 2-ton furnace is used to refine crude pig iron. The chemical and physical properties of the metal are given below:

	Analysis of charge. Per cent.	Analysis of cast. Per cent.
Carbon	4.0	0.50
Phosphorus	1.8	0.025
Sulphur	0.2	0.03
Manganese	0.0	0.76
Silicon	1.05	0.056
Breaking strain	95,000 lb. per sq. in.	
Elongation	20 per cent.	
Contraction of area	36.33 per cent.	
Duration of conversion	5 hours.	

SUMMARY OF METALLURGICAL FEATURES.

1. Having no electrodes, facilities are provided for heating the bath without introducing impurities and the charge may be left indefinitely in the Röchling-Rodenhauser furnace without change.

2. Having a large open hearth (in the 1.5-ton furnace it is 60 by 26 in. or 1.52 by 0.65 m.), with doors it is possible to do any class of refining in the Röchling-Rodenhauser furnace much the same as in the open hearth furnace.

3. When the hearth doors are closed the Röchling-Rodenhauser furnace is air-tight and may be left for long periods without great loss of heat, making intermittent working possible.

4. The natural gentle movement of the charge allows of complete mixing of the ingredients of the charge, and is not sufficient to attack the lining.

Costs of Production

Royalty: The German users of the induction furnace pay $0.65 per ton for rail steel and $1.50 per ton for crucible quality steel. This is for small daily production. For 1000 tons daily the royalty is placed at $0.36 per ton for rail steel and for 1200 tons daily it is $0.50 for crucible quality steel.

Energy Required: A great many figures have been given out, most of which were for small furnaces and special runs. The plants at Trollhattan and Volklingen being in commercial operation supply the most reliable figures obtainable.

Cold Pig and Scrap: With cold materials, refining, &c., to crucible quality steel is done with 600 to 900 kw-hr. per ton according to the size of the furnace.

Hot Pig and Scrap: With hot pig iron and cold scrap crucible quality steel is obtained with 300 to 700 kw-hr. per ton according to the proportions of the two ingredients and the size of the furnace.

Hot Metal from the Converter: Converter material with an analysis of P, 0.08 per cent.; S, 0.08 per cent.; Mn, 0.5 per cent.; C, 0.1 per cent. is refined to steel for rails with an analysis of P, 0.05 per cent.; S, 0.04 per cent.; Mn, 0.85 per cent.; C, 0.5 per cent. with 100 kw-hr. per ton in a 7-ton furnace. Same material is refined to high quality steel showing only traces of P and S; Mn, 0.2 per cent.; C, 0.5 per cent., with 250 kw. hr. per ton.

Hot Metal from Open Hearth Furnace: Material from open hearth furnace, already dephosphorized and desulphurized and containing 1,22 per cent. C; Mn, 0.38 per cent.; Si, 0.21 per cent. to high quality steel with 200 to 250 kw-hr. per ton.

1. Cost with a 1.5-ton furnace melting scrap and refining to pour best steel for steel castings. Furnace of

the three-phase, tilting type. 50 cycles, 210 kw. and power factor 0.80.

Interest Charges: Cost with all accessories about $9000. With 10 per cent. for interest charges gives $900 annually. Using 290 working days in a year and six charges, 3 to 3.5 hours each, daily and 1500 lb. to a charge gives 4.2 tons daily and 1220 tons yearly. This is equivalent to about 21 hours working. Cost per ton for interest, $0.74.

Labor: Two men can attend to this furnace with ease, as the electrical part requires no special attention. The melter adjusts the temperature and watches the metallurgical process. The helper sees to the fan and charging, &c. Allowing two shifts and $5.50 per shift or $11 daily gives a labor cost of $2.62 per ton of steel.

Lining: Relining may be done every 8 or 14 days. It takes three tons of magnesite and 0.36 ton of tar to completely reline the furnace. The relining is done with half new material and half old. For getting out the old lining, mixing material and putting in the new, four men are allowed 16 hours. Cost of lining per ton of steel, on an average, $1.50.

If lined with dolomite, which is cheaper, and every 14 days, then lining cost, allowing one-third material recovered, is $1 per ton of steel.

Keeping Warm: When the furnace is not used for several hours during the night it must be kept warm, for which about a third of the working amount of energy is necessary. In this way if normal energy is 200 kw. then about 200 kw-hr. will be necessary to keep the furnace warm over the three-hour period of rest. For six working days this is necessary five times and 1000 kw-hr. must be charged up to heating. Cost of keeping furnace warm at $20 per kw-yr. is $0.09 per ton of steel.

Cooling of Transformer: The blower takes a 2.5-hp. motor or 1.8 kw. and for 24 hours=43 kw-hr. Cost of cooling transformer per ton of steel, $0.02.

Energy Consumption: From cold materials about 850 to 900 kw-hr. are necessary, in this size furnace. Taking larger figure the cost of energy per ton is $2.06.

Royalty: In the United States, on the basis of a plant of 50 tons daily the royalty would be about 50 cents per ton.

Summary of Cost.

Interest charges	$0.74
Labor	2.62
Lining	1.50
Keeping furnace warm and cooling	0.11
Royalty (approx.)	0.50
Energy for melting and refining	2.06
Total	$7.53

The figure $7.53 is the working cost which must be added to the cost of the materials in order to find the cost of crucible quality steel from scrap. The above figure would be more reasonable with larger furnaces.

2. Cost with a 2-ton, 300-kw., three-phase tilting furnace.—Molten converter steel to quality steel for castings.

Cost with all accessories about $12,500. With 10 per cent. for interest charges gives $1250 per annum. Allowing 250 working days in the year and 16 tons per day gives 4000 tons per annum, or $0.31 per ton of steel.

Interest charges per ton of steel	$0.31
Power for heating up, per ton of steel	0.02
Power for refining, allowing upper figure of 300 kw.-hr. at $20 per kw-yr.	0.68
Air cooling of furnace core	0.01
Cost of lining every 10 days (German figure)	0.35
Wages, allowing $16 per day	1.00
Royalty on basis of 50 tons daily	0.50
Total cost per ton of steel	$2.87

This figure would give a good idea of the cost of converting molten pig iron into steel, exclusive of the ferroalloys.

3. Cost with a 5-ton, 550-kw., three-phase tilting furnace.—Molten converter steel to crucible quality steel.

Cost with all accessories about $22,000. With 10 per cent. for interest charges gives $2200 per annum. Reckoning 250 working days in the year, each one with eight heats of 5 tons, the yearly production would be 10,000 tons, or $0.22 per ton for interest charges.

Interest charges	$0.22
Power, including heating up. For a monthly average of 230 to 280 kw.-hr. per ton and taking the higher figure	0.64
Cost of lining (German figure)	0.30
Wages, allowing $20 per day	0.50
Air cooling of core	0.01
Royalty (approx.), basis of 50 tons daily	0.50
Total	$2.17

4. Cost with a 7-ton, 750-kw., three-phase 25-cycle, 0.6-power factor tilting type furnace.—Converting molten converter steel into high grade rails.

Cost with all accessories $27,000. Interest charges at 10 per cent. gives $2700 per annum. Allowing 100 tons daily (the makers claim a production of 140 tons) and 250 working days in the year gives a yearly production of 25,000 tons of rail steel and interest charges per ton of steel equals $0.11.

Interest charges	$0.11
Power for heating up	0.01
Power for refining. Makers claim 100 kw.-hr. per ton. Allowing 150 kw.-hr. per ton	0.34
Power for cooling	0.01
Cost of lining. Pneumatically tamped. Two foremen and six laborers, or $21 daily. Per ton	0.02
Cost of lining material (German figure)	0.06
Wages. Two head melters at $3 and 10 helpers at $2.50. $31 per ton	0.31
Royalty on rail steel, one furnace in U. S.	0.35
Total	$1.21

This is the conversion cost, which added to the value of the pig and ferroalloys, &c., gives the cost of steel for rails. The Prussian railroads paid $10 extra per ton for rails made in this furnace and were well pleased with the product.

5. Cost with a 7-ton, 750-kw., three-phase, 25-cycle, 0.6-power factor, tilting type furnace.—Molten converter steel to highest quality steel.

This furnace will produce about half the steel of this quality as when working on rail steel, or 50 tons daily. The cost per ton under these conditions is about $2 per ton, including royalty.

SUMMARY OF COSTS OF PRODUCTION EXCLUSIVE OF MATERIALS.

1.5-ton furnace melting scrap and refining to pour high grade steel for castings. Per ton	$7.53
2-ton furnace refining molten converter steel to high grade steel. Per ton	2.87
5-ton furnace refining molten converter steel to high grade steel. Per ton	2.17
7-ton furnace refining molten converter steel to high grade steel. Per ton	2.00
7-ton furnace refining molten converter steel to high grade rails. Per ton	1.21

A. M. Byers & Co., Inc., Pittsburgh, have about completed large extensions and additions to their pipe mill in that city, which is now equipped for the manufacture of pure wrought iron pipe by the most improved methods. The new plant covers nearly two city blocks, and will treble the former capacity. The new buildings are of concrete, brick and steel construction, and are largely equipped with electrical machinery. Welding furnaces have been installed; also several Morgan electric cranes for carrying material to cars or to the new warehouse.

The Allegheny Steel Company, Brackenridge, Pa., manufacturer of open hearth tank plates, Reliance boiler tubes, sheets, steel castings, &c., is building an addition to its sheet mill building, consisting of a steel structure, 80 x 120 ft. The plate mill building is also being increased by an addition 100 ft. in length. Some new cranes will be needed to serve these extensions.

The business of the Osgood Dredging Company, Albany, N. Y., including patents and patterns, has been purchased by the Marion Shovel & Dredge Company, Marion, Ohio. The headquarters of the merged company will be at Marion.

Press reports that the machine shops of the Erie Railroad are to be removed from Kent, Ohio, to Youngstown, Ohio, are officially denied.

Personal

W. A. Hitchcock, Unionville, Conn., has been elected president of the Upson Nut Company, Cleveland, Ohio, to fill the vacancy caused by the death of Andrew S. Upson. Mr. Hitchcock has been connected with the company for 35 years, and has been secretary as well as the manager of the company's plant in Unionville for about 15 years. He was succeeded as secretary by F. H. Rose of Cleveland, who has been assistant treasurer. Mr. Hitchcock will move to Cleveland.

Alexander Crawford has been appointed purchasing agent for the Hyatt Roller Bearing Company, Newark, N. J.

S. M. Rodgers, metallurgist of the American Steel & Wire Company, delivered an address before the Cleveland Engineering Society, April 11, on "The Practice of Making Steel."

H. G. Wilson, formerly manager of the Cleveland office of the Pittsburgh Shafting Company of Detroit, Mich., has been made manager of the Detroit office, with general supervision also of the Cleveland territory, succeeding in this capacity L. B. Parker, who has been made general manager of the Columbia Steel & Shafting Company, with headquarters in Pittsburgh, Pa.

Rodman Gilder, secretary of the Crocker-Wheeler Company, manufacturer of electrical machinery, Ampere, N. J., has resigned to become associated with the brokerage house of Dick Bros. & Co., 30 Broad street, New York.

F. H. Crawford, formerly office manager of the New Castle Stamping Company, New Castle, Pa., is now general manager of the Keystone Enameling Company, Sharpsville, Pa., manufacturing kitchen enameled ware.

Hamilton G. Stalnaker of the Ohio Iron & Metal Company, iron and steel scrap, Farmers' Bank Building, Pittsburgh, has gone to Europe for the benefit of his health.

George E. Miller has resigned as manager of the Cleveland sales office of the Westinghouse Electric & Mfg. Company, to accept a position with the Cleveland Electric Illuminating Company. The management of the Cleveland office of the former company will hereafter be conducted from the Pittsburgh office.

Charles E. Adams, president of the Cleveland Hardware Company, has been elected president of the Cleveland Chamber of Commerce.

A. H. Teuchter, president of the Cincinnati Bickford Tool Company, Oakley, Ohio, sailed from New York, April 17, for a several months' business and pleasure trip through Europe.

President A. C. Dinkey of the Carnegie Steel Company, Pittsburgh, Pa., denies the report which has been extensively circulated that he intends to resign from that position.

Robert A. Murray, Farmers' Bank Building, Pittsburgh, has been appointed agent in the Pittsburgh district for the Atlas Engine Works and the Chandler-Taylor Company, both of Indianapolis, Ind. He will handle their medium speed engines.

William E. Sandford has resigned as superintendent of the pipe mill of the Mark Mfg. Company, Zanesville, Ohio, to accept a similar position with the Page-Hersey Iron, Tube & Lead Company, Welland, Ont., Canada.

The New Departure Mfg. Company, Bristol, Conn., maker of New Departure ball bearings, is enlarging its already extensive corps of engineers. Victor E. Page, Pawtucket, R. I., for some years past managing editor of the *Automobile Journal*, is the latest addition to the force.

H. J. Koontz, Farmers' Bank Building, Pittsburgh, has been appointed sales agent in the Pittsburgh district for the Queen City Punch & Shear Company, Cincinnati, Ohio.

The Crucible Coal Company, a subsidiary of the Crucible Steel Company of Pittsburgh, will probably be mining coal at the rate of 60,000 tons a month before January 1. The plans for the development of the company's coal land near Rice's Landing on the Monongahela River call for the sinking of two large concrete lined hoisting shafts and one air shaft. Steel shaft houses and tipples extending over a proposed four-track coal siding and down to the river will be built. The company will also build 150 steel coal barges and four steel towboats. The Monongahela Division of the Pennsylvania Railroad will soon be extended to the new mines. J. C. Neff is general manager of the coal company.

Obituary

WILLIAM SEARLES GORTON, secretary and general manager of the Standard Welding Company, Cleveland, Ohio, was instantly killed April 17, by being struck by a fast train while driving across the Lake Shore tracks in an automobile near the plant of his company. He was born in Waterford, Conn., February 12, 1859. He received his education in the public schools of that city and learned the machinist trade. He served for four years in the marine department of the United States Coast Survey, and later was assistant engineer on cable railroad construction in Eastern cities. For some time he was a traveling man for the Thomson Electric Welding Company, Lynn, Mass. In 1897 he became connected with the Standard Tool Company, Cleveland, and in 1899 assisted in organizing the Standard Welding Company. This company at first confined its products largely to steel tubing and electrically welded parts for bicycles, but it soon branched out into the manufacture of automobile rims. Under the able management of Mr. Gorton, and aided by the growth of the automobile industry, the company's business grew fast, and a large plant built in 1908 has since been doubled in capacity, the present plant being one of the largest in Cleveland. He leaves a widow, three daughters and one son. His brother, F. C. Gorton, is also connected with the Standard Welding Company.

LUDWIG WOLFF, president of the L. Wolff Mfg. Company, Chicago, manufacturer of plumbers' supplies, died at his home in that city April 14, after a long illness, from a complication of diseases which culminated in pneumonia. He was born in Germany, March 11, 1836, coming to this country in 1854 with his parents and eight brothers and sisters. After numerous disheartening experiences, he applied to the Chicago & Northwestern Railroad, Chicago, for employment and showed the officials how to make bent steam pipes for locomotives. He was then given a contract and established a small shop, borrowing the necessary material. His business grew, and he began to make cooking utensils, then copper range boilers and later plumbers' supplies. In 1866 he purchased the interest of his partner, Terrence Maguire, and later organized the L. Wolff Mfg. Company, which became one of the leading establishments of the country in its line. He was married three times, his third wife dying in 1907. He leaves five sons and one daughter.

JOHN P. HUGHES, vice-president of the Chicago Foundry Foremen's Association and superintendent of the foundry of the Allis-Chalmers Company, died April 7 at St. Joseph's Hospital, where he had undergone an operation for appendicitis.

GEORGE H. BISHOP, of the George H. Bishop Saw Works, Lawrenceburg, Ind., died at French Lick Springs, Ind., April 12, aged 55 years.

The Washington Tin Plate Company, Washington, Pa., has under consideration the addition of six sheet and pair furnaces, two annealing furnaces and a 15-ton electric traveling crane, with a 56-ft. span and 20-ft. lift. The plans for these additions are being prepared by S. Discher & Sons, Farmers' Bank Building, Pittsburgh, who are also taking estimates on the work.

The La Belle Iron Works, Steubenville, Ohio, is receiving estimates for the building of eight more sheet mills and two jobbing mills, but a definite decision regarding these additions has not been made. This company now has eight sheet mills, but has a surplus supply of sheet bars which it sells in the open market.

The Ratio of Burden to Labor*

Its Natural Increase in Modern Manufacturing Processes

BY JAMES B. STANWOOD.†

In all manufacturing processes in the determination of the cost of the finished article, it is usual to divide it into three elements: The cost of the material used, the cost of the labor that can be charged to the conversion of this material into the finished product, and the amount of the burden or overhead expense. This burden includes the cost of all other expenditures of labor and material necessary for carrying on the processes of production, which are general in their character, and which cannot be charged directly to any portion of the actual labor or material. In this connection the cost of selling the product should not be neglected, but should be considered a part of the burden. The ratio, then, of the burden to the direct labor or burden labor ratio may be expressed by a fraction $\frac{B}{L}$ in which B represents the total cost of the burden of a department or factory for a unit period of time, and L the total direct labor cost of the same, for the same factory or department, for the same unit of time.

Examples of Change in Burden Labor Ratio

As a result of the constant improvement in machinery and processes, or, to use a popular phrase, because of the increase in "labor saving devices," it can be stated as a law that the ratio of burden to labor naturally tends to increase from year to year or period to period as industry progresses. This can be shown by an illustration: Let the material, labor and burden in a given process be equally divided so that each has a unit value of 2, then the total cost is 2 plus 2 plus 2 equals 6. The burden labor ratio being $\frac{2}{2}$ equals 1. If, now, by an improved machine or by an improved process the labor is cut in half, then the total cost becomes 2 plus 1 plus 2 equals 5, and the burden labor ratio will be $\frac{2}{1}$ equals 2. This is on the assumption that no other change has been made than that of cutting the labor in two. Let us consider a different set of values, in which the material is assumed to be 2, labor 12 and burden 6. The total cost then becomes 2 plus 12 plus 6 equals 20, and the burden labor ratio is $\frac{6}{12}$ equals ½. Suppose that an improved process or machine now reduces the labor from 12 to 3, a rather uncommon experience; now the total cost becomes 2 plus 3 plus 6 equals 11, and the burden labor ratio is $\frac{6}{3}$ equals 2. The saving in total cost is 45 per cent., but the burden labor ratio is increased fourfold.

In many cases in practice, the saving in labor as outlined in these examples is brought about by the introduction of some new device or machine which is sold generally to the trade, so that it is open to all manufacturers to secure the benefit of this improvement; but it also usually happens that the competition among manufacturers gives most of this benefit to the consumer, and after a short period all the manufacturers are practically on the same basis, using the same grade of materials, the same type of tools and employing labor at about the same cost.

If this law of the natural increase of burden labor ratio is not recognized, it follows that manufacturers who base their cost estimates on previously ascertained burden labor ratios find themselves in the position of selling their goods at a low margin of profit, or no profit, or even at a loss.

Actual Burden Increase

The examples here given assume that the total burden itself does not in any way increase or decrease absolutely; on the other hand in many instances where improved machines or appliances are employed the total burden itself actually does increase. More elaborate machinery calls for greater care for upkeep and for a greater depreciation. It frequently follows that although the net cost of the product is greatly reduced by a saving in labor, yet this entire saving in labor is not realized on account of an actual increase in burden.

A prominent manufacturer recently stated to the writer that the use of "high speed" steel greatly increased his burden labor ratio over the use of the older steels. This of course is due to the reduction in labor cost which the "high speed" steel effected, but in addition the increased cost of this steel and the increased cost in the upkeep and the depreciation of machines required to use it also increase the actual burden; the net manufacturing cost, however, has been greatly reduced by the use of these improved cutting metals.

The reduction in the labor cost of an article, as shown above, cheapens it to the manufacturer and ultimately, with free competition among the manufacturers, cheapens it to the consumer.

The Problem of Increased Product

The usual advantage claimed for labor saving machines to the manufacturer lies in the fact that they increase the capacity of his plant. If, as in the last rather extreme example, the labor cost is reduced to one-fourth of what it originally was, it means that one man or one machine will produce four times more than before the improvement was adopted. The result of this is a large increase in plant capacity with the attending necessity of finding a correspondingly large market for the output. When the reduced cost of production gives one manufacturer an advantage over another, he secures his market by taking the trade from the other who may be less favorably equipped. When on the other hand all manufacturers in the same line install the same machinery at about the same time and by competition the price is reduced, then the only increase in market can come about by reason of the reduced cost to the consumer. In some cases a greater demand due to the decrease in the cost of the goods tremendously increases the volume of business; in others, where a decrease in cost does not easily produce an increase in demand, the burden is increased in the effort to make a market.

Man who in the beginning had but few implements, and these of the crudest form, has in the process of his marvelous development made his tools more and more efficient and elaborate, and thereby has greatly increased the burden labor ratio.

High Economy and High Burden Labor Ratio

A striking example of this extensive and elaborate use of tools is found in the appliances used in the numerous processes of the entire plant which the United States Steel Corporation has in operation for digging the iron ore from the ground in Minnesota, conveying it to Gary, Ind., and making it into such products as rails and structural steel. In this continued process from mother earth to the finished product very little direct labor is put on the material in the entire course of its conversion. Everything is done by a machine—the digging of the ore, its transportation by steam through the lakes, the unloading and the feeding of the ore to the furnace, the conversion of the melted metal into steel, the formation of a billet, and the rolling of the billet into finished product. In this case the actual labor falls on those who attend the machines. This includes, of course, the sailors and crews on the lakes, operators on the railroad in Minnesota, as well as the men at the mines, and in the steel plant at Gary. This extensive operation possesses a tremendous burden in relation to the direct labor ex-

* Presented before the Congress of Technology, Boston, Mass., April 11, 1911, at the 50th anniversary of the charter of the Massachusetts Institute of Technology.

† Vice-president and engineer, Houston, Stanwood & Gamble Company, Cincinnati, Ohio.

pended, and yet, as is well known, the entire process is one embodying the highest economy of production.

In conclusion it may properly be suggested that a scientific study of the cost of burden is an undertaking that promises the attainment of new economies; for great reductions are possible in the cost of administration, of operation, of buying and selling, and in the maintenance and depreciation of plant. Thus, in striving for more efficient production, burden saving methods are fully as valuable as labor saving devices.

Metal Rolling in the United States

Comments of a British Visitor

At a recent meeting of the Birmingham, England, section of the Institute of Metals, G. A. Boeddicker read a paper giving observations on practice in American metal rolling and drawing plants. The works he had seen he found quite up to date, with electric power generally in use except for rolls. The engines are all slow running.

Rolls are generally driven from a jack shaft, a convenient arrangement whereby any number of rolls can be put side by side without being coupled together. That enables the speed of the different rolls to be varied as required, while a breakdown of one or another does not interfere with a whole train. Where that arrangement is adopted the engines run from 75 to 100 revolutions.

Great care is taken everywhere in using only pure metals for the alloys made. Lake copper is generally used. The spelter is of exceptional purity, containing 0.4 to 0.1 per cent. of lead, and even if the alloy produced should contain lead, only pure spelter is used and pure lead added to the alloy. The casting is done on a larger scale, but is probably not quite so well done as in Great Britain, owing to the fact that there being no casters' lads employed, laborers without experience are sometimes put to the casting of German silver and brass. The furnaces are mostly of the round type; the fuel anthracite, and generally 160-lb pots are used, the metal being cast into ingots of 75 to 100 lb. For narrow metal the ingots are 6 in., while for sheet metal they are 12 in. wide. In pouring, a small funnel is put on the top of the mold, which is lined with fireclay and has four holes in the bottom to split the metal. All slag and charcoal remain in the funnel and cannot get down into the mold. A similar plan is used in casting rods. These are sometimes cast into split molds and sometimes into solid molds. Where the latter are used they are open at the bottom and fitted with a plunger about 6 in. long. When the rod is poured and has set, but while still red hot, the plunger is pushed up 4 or 5 in.; that pushes up the rod, and there it is left until quite cold, when it can be readily lifted out of the mold. Americans go to great trouble and expense in cleaning the surface of the ingots before rolling. Sometimes these are scraped all over on a "scalping" machine, and sometimes planed, in which case a shaving ⅛ in. thick, is generally taken from each side of an ingot 1¾ in. thick, which means about 14 per cent. of scrap from one operation alone. He felt thankful that the scalping process is avoided in British practice.

Rolling and Wire Mills

The rolling mills are generally speeded up. At Waterbury they "break down" at 10, "got down" at 22 and finish at 45 revolutions, while at the Riverside Mills they break down at 20 and finish at 50 revolutions. As a result of that speeding up a pair of rolls probably goes through two or three times as much work as is the case in England. The rolls are fitted with automatic coiling arrangements for coiling the strip as rolled. That is rendered necessary by the length of the strips, which would otherwise be too long for the annealing furnace. The annealing is done in oil-fired open furnaces, sometimes at the same temperature as in British practice and sometimes at much higher temperatures. The metal is conveyed from the rolls to the muffle on a tray and lifted bodily into the furnace by a simple pulley arrangement, the operation taking only a few minutes. A charge of 20 to 30 cwt. is left in the furnace for an hour or an hour and a half. Narrow strips are not put in flat, but placed on edge sideways between pegs riveted on the tray so that no two strips touch each other. When the metal is withdrawn from the furnace it is instantly quenched by a jet of water. The annealing furnaces measure about 6 ft. by 15 ft.

The gang slitters and shearing machines are fitted with automatic scrap-cutting devices. There are pickling, brushing and drying machines and overhauling machines for thin strips, where the metal passes over several rollers and where one man inspects one side and another man the other.

In the large Waterbury wire mills the wire is transported from the blocks to the annealing furnace and from them to the pickling shop and back again to the blocks by means of overhead electric trolleys. Apart from bull blocks, continuous machines of the Waterbury type are general throughout America. The English system of rolling bars, slitting them, and drawing the slittings is practically abolished and rod rolling is introduced not so much for the sake of economy, as in order to get rods of 56 to 60 lb. For pin wire, or any other wire down to 18 or 20 gauge which is not required in heavy coils, the English system is probably quite as economical as rod rolling. All the plant is electrically driven, and in one case the motors are placed beneath the floor and connected to the mills above by short belts. The annealing furnaces for rods are open cylindrical furnaces which can be conveniently charged from the electric trolley overhead.

Discussion

In the discussion of the paper, as reported by the *Ironmonger*, one member agreed with the speaker as to the inferiority of American castings. This results either from the use of bad or rough iron molds or insufficient care in scraping and dressing them. The thing that struck him most in going over some American mills was the large number of costly subsidiary machines employed. They are so numerous and so important that the rolling mills themselves are almost lost among them. The lists of sizes issued by American manufacturers to their customers are of a more definite character than those used in Great Britain and prevent customers substituting thinner and thinner gauges for the various sizes. Another member said he had seen strip taken into American mills which would be promptly rejected in England. As a rule it is put on the overhauling machine, and even after it is scraped the spills sometimes remain; nevertheless they are able to produce good brass.

Mr. Bean of Allen Everitt & Co., Ltd., said that while British manufacturers at times make something verging on a profit, American mills are making 12½ per cent. and more profit every year. It is all a question of power and speed; quick and powerful machinery is the secret of their success. The high wages paid to operators by American manufacturers has not been an unmixed evil, for it drove them to adopt powerful labor-saving machinery. He had been struck by the splendid surface on American rolled metal, and if that resulted from the use of the scalping machine he would be pleased to see such machines used in England.

The author of the paper, in summing up made the remark British iron and steel manufacturers usually make in commenting on the large tonnages from American steel works. Many of the improvements he had referred to are only advantageous, he said, where the quantities of material to be dealt with are large. They would probably be found impracticable in Europe, partly because the works are not large enough and partly because the orders received are smaller and more diverse. Where the Americans deal with four or five different qualities of German silver, European manufacturers have to deal with about 20, and where the former get one order for five tons of one size and one gauge, manufacturers in Great Britain get, perhaps, a hundred orders for a hundred different sizes. It is therefore a mistake to assume, because British manufacturers have not more generally adopted Western ideas, that they are behind.

The Congress of Technology in Boston

The Congress of Technology, which met in Boston, April 10 and 11, in celebration of the semicentennial of the signing of the charter of the Massachusetts Institute of Technology, was a pronounced success on the two main lines laid down by its projectors.

The opening session of the congress was begun with an address by President Maclaurin of the Institute, who spoke on "Some Factors in the Institute's Success," and attributed that success primarily to the method of instruction, now everywhere accepted, but not long ago a debated and somewhat scorned venture. "Apart from his appreciation of the value of all sound learning," said Dr. Maclaurin, "William Barton Rogers, the founder and first president of the Institute, saw clearly that the whole controversy as to the relative merits of science and the classics in the field of education missed the mark by placing the emphasis in the wrong place. He understood that when one gets to the root of things in education, the method rather than the subject is of supreme importance, and his insistence on the value of method in teaching was the cardinal doctrine in his creed and the one that has contributed most to the success of the Institute."

The daylight hours of the second day were given over to the presentation of papers on various aspects of applied science. These papers were grouped in six divisions, and the times of reading were so arranged that the general public, a large number of whom had received personal invitations, were enabled to hear papers in several divisions on topics in which they were particularly interested. The result of these sessions amply justified the plan. Every session was very largely attended, and as the papers dealt not with educational or technical abstractions, but were, on the contrary, striking and vital reports from the actual field of industrial work, the large audiences gained a better conception than would otherwise have been possible of the fashion in which applied science has remade the life and habits of the world within the last half century.

The congress has set clearly before the public the needs and the possibilities of what the speakers on Tuesday evening called the "New Technology." The high standard of the Massachusetts Institute of Technology and its well deserved fame as one of the very foremost technical schools in the world hardly need reiteration. But the very success of the Institute has brought it to a point where insufficient endowment and cramped quarters threaten seriously to interfere with its future usefulness unless the obstacles are very soon removed. The banquet in Symphony Hall on Tuesday evening, April 11, provided a significant sign of keen appreciation of this need both by the alumni of the Institute and by many other outside of its immediate ranks. The enthusiasm of the thousand alumni and guests who filled the floor of the hall was reflected in the words of the speakers, who included two such notable figures in Institute affairs as President Lowell of Harvard, long a member of the Corporation of Technology, and President Emeritus Eliot of Harvard, who was professor of chemistry in the original Institute faculty. The temper of this great meeting was significant in showing a sharp consciousness of a new era created by applied science; of the important part that has already been taken by graduates of the Massachusetts Institute; and of the pressing need, especially from the point of view of the interest of Massachusetts, that the Institute should be immediately equipped with the additional means for enabling it to continue in the future as it has been in the past, a leader in technical education.

The practical earnestness of the alumni in doing their full share toward making possible the "New Technology" was shown in three announcements made by President Maclaurin from the platform after the banquet. One alumnus, who wished his name withheld, has offered to the Institute a tract of 1000 acres of land in Maine, well suited to the uses of a summer school in civil engineering. Other alumni have definitely pledged themselves to give a very large part of the price necessary for buying a new site for the Institute. Edward N. Eagar, president of the Universal Portland Cement Company, has promised as a gift all the cement needed for erecting the new buildings in reinforced concrete. Meanwhile the question of the site itself, Dr. Maclaurin said, has been narrowed to a choice between three sites, all of which are within a short distance of the present building. It is expected that this question of a new site, upon which everything else on the development of the Institute depends, will very soon be settled.

Large Condenser Installations.—The Wheeler Condenser & Engineering Company, Carteret, N. J., has recently been awarded the contract for five notable surface condensing equipments. The condensers proper will all be of the Wheeler dry tube type, described in *The Iron Age*, October-7, 1908. These equipments will differ, however, from previous condensers in the special design necessary to handle the enormous amounts of steam, at the same time securing high vacuum and high rate of heat transmission through the surface. Three of these condensing equipments will be for the Waterside No. 1 plant of the New York Edison Company, and will consist of circulating, hot well and vacuum pumps, together with specially designed base condensers to operate in connection with three 20,000-kw. turbo-alternators. These condensers will have a rated capacity of 300,000 lb. of steam per hour, and will be the largest of their kind in the world. The other two equipments will be for 10,000-kw. turbines and with pumps and other auxiliaries are for the new power station of the Minneapolis General Electric Company.

Among recent sales of the Terry Steam Turbine Company, Hartford, Conn., are the following: Marconi Wireless Telegraph Company, New York, 4-hp. direct connected generator; Boston Elevated Railway, seven pumping sets; Crocker, McElwain & Co., Holyoke, Mass., 25-hp. turbine, direct connected to a pump; Kirkman & Sons, Brooklyn, N. Y., 70-hp. condenser circulating set; Birmingham Gas Works, Birmingham, N. Y., 60-hp. blowing unit; Empire Steel & Iron Company, Mt. Hope, N. J., 30-hp. circulating set; United Electric Light Company, Springfield, Mass., 50-kw. generator set; Fisherman Cold Storage Company, Provincetown, Mass., 25-hp. pumping set; Union Railways Supply Company, Atlantic Highlands, N. J., 25-hp. forced draft set; Cleveland Electric Illuminating Company, Cleveland, Ohio, 380-hp. turbines, to drive boiler feed pumps; Consolidated Coal Company, Fairmont, W. Va., 200-hp. pumping set; Sandusky Portland Cement Company, Dixon, Ill., 60-hp. condenser circulating set.

An interesting installation of electrical machinery was recently completed at Boley, Okla. All the inhabitants of the town are colored people, the town having been started under the auspices of Wiley University, Marshall, Texas, which is an institution for the higher education of colored people controlled by the Freedmen's Aid Society of the Methodist Episcopal Church. The apparatus installed was supplied by the Gregory Electric Company, Sixteenth and Lincoln streets, Chicago, Ill., and the plant is of interest as being the first electric light and power plant in the United States installed, operated and owned by colored men. All the electrical engineering work was done by colored people.

A special meeting of the stockholders of the Firth-Sterling Steel Company, Pittsburgh, has been called for June 12 to vote on a proposition to sell the projectile plant belonging to this company near Washington, D. C., to the Washington Steel & Ordnance Company, which is being organized to operate the plant. The Firth-Sterling Steel Company will receive in payment capital stock of the Washington Company. The stockholders will also be asked to vote for a reduction of the common stock to the amount of 7500 shares, and the issue in lieu thereof of 7500 shares of preferred stock, representing $750,000 of capital stock. There will then be $750,000 common and $750,000 preferred stock.

Employers' Liability and Workmen's Compensation*

A Review of the New Jersey Law and Its Elective Feature—The Question of Insurance

BY WM. B. DICKSON.†

In discussing the subject of "Employers' Liability and Workmen's Compensation" I will not attempt to review the past nor to indicate the steps by which this important subject has been brought so prominently before the American people. The evils of the old system are generally recognized and admitted by intelligent employers. That public opinion has been thoroughly aroused is evident from the fact that in 10 States commissions have been appointed by the Governors or Legislatures to study these questions and recommend legislation.

In April, 1910, Governor Fort of New Jersey, acting under a joint resolution of the Legislature, appointed a commission to inquire into and recommend legislation on the subject of employers' liability. This commission, of which I had the honor to be president, was composed of two employers, two representatives of labor and two legislators, one each from the House and the Senate. In January of this year the commission presented its report, accompanying it with a proposed bill on employers' liability and workmen's compensation. This bill passed in the Senate by a vote of 16 to 1 and on Monday of this week passed in the House by the remarkable vote of 54 to 0, and was signed by Governor Wilson on Tuesday, April 4.

New Jersey has thus given a notable lesson in nonpartisan legislation. The commission was appointed by the Republican Governor Fort. The commission's bill was passed by a Republican Senate by a vote of 16 to 1 and then by a Democratic House by a vote of 54 to 0. Last, but not least, it was signed by that great representative of true Democratic principles, Governor Wilson. I am by tradition a Republican, but if the Democratic party can produce and will sustain leaders such as Governor Wilson in New Jersey and Francis Lynde Stetson in New York, I can imagine no more inspiring career for the young man, ambitious to serve his country, than to fall in behind and keep step with such men.

The bill, which is divided into three sections, may be briefly outlined as follows:

Changes in Previous Laws

SECTION I.—This section deals entirely with modifications of the present law. It retains the proviso that the negligence of the employer must be shown to have been the natural and proximate cause of the injury. This proviso was retained, not because the commission did not believe in compulsory compensation, but because the weight of legal opinion received in reply to inquiries was against the constitutionality of any plan whereby an employer would be compelled to compensate an injured workman regardless of his (the employer's) fault or negligence. The wisdom of this conclusion has since been demonstrated by the recent decision of the New York courts declaring the New York act in this respect to be unconstitutional, even in the hazardous trades.

The New Jersey elective scheme differs from that of New York in an essential feature, in that the election must be made at the time of hiring, whereas in New York it is made after the accident. As a result, I am informed that the New York law has been practically a dead letter, as the workmen have naturally elected to sue under common law rights. In New Jersey, if the workman at the time of hiring refuses to accept a compensation law which the Legislature has declared to be equitable, the employer can refuse to hire him, and in doing so will no doubt be sustained by public opinion.

Section I, however, modifies the present law of employers' liability by entirely abrogating the two old defenses usually known as "fellow servant" and "assumption of risk." It also modifies the law of "contributory negligence" by providing that the employer must prove that the negligence of the employee was "willful." This term is defined in the bill as: (1) Deliberate act or deliberate failure to act, or (2) such conduct as evidences reckless indifference to safety, or (3) intoxication.

It will be observed that this section deals entirely with the liability of the employer and, standing alone, strips the employer of those defenses which in the past have been of the greatest value to him in defending suits at law.

The members of the commission were unanimous in their opinion that, regardless of any other legislation, the above modifications in the present law should be made, for the following reasons:

1. The defense of "fellow servant." In the great majority of cases the employee has no voice in the selection of his fellow servants, and the mere fact of having the same employer should not in itself release the employer from a liability which he would otherwise incur.

The injustice of this rule may be illustrated thus: An accident occurs, due to the act of an employee, which results in the injury of a fellow employee and also of an outsider in no way connected with the work. The outsider may and often does secure redress, while the employee is barred solely on account of his being a fellow servant.

2. The defense of "assumption of risk." While theoretically a workman may be presumed to have a choice in the selection of his employment and to have carefully weighed the risks naturally inherent therein before going to work, as a matter of fact in the vast majority of cases the choice is narrowed down to the acceptance of such risks or no work. In this connection the objection has been made by some employers that for extra hazardous work extra wages are paid. An instance was cited where riveters in a shop were paid $3 per day, while men doing the same work in the erection of high steel buildings were paid $6. The commission's view of this objection was that in the case of the workman on the high building he was placing his life and limbs in jeopardy every minute of the day, and this should be a sufficient offset to the extra wage without asking him to throw in the scale also the future welfare of those naturally dependent on him.

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In suggesting these modifications in the present law the commission intended primarily to abolish these obsolete defenses because of their inherent injustice. Incidentally, however, the removal of these defenses leaves the employer in a less tenable position in ordinary suits at law, and he will therefore naturally be more willing to assent to the provisions of Section II.

Elective Compensation for Workmen

SECTION II.—This section contains an elective system of workmen's compensation, and is made as nearly as possible automatic and universal by providing that every contract of hiring, express or implied, shall be presumed to have been made with reference to the provisions of this section, unless either party has notified the other in writing of his intention to continue under his common and statute law rights, as expressed in Section I. Then follows the schedule of compensation, which may be briefly summarized as follows:

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definite injuries has been prepared covering as nearly as practicable the most common and obvious forms of injury. The compensation is half wages, ranging from five weeks for the loss of one joint of a toe up to 200 weeks for an arm.

For death, the compensation is based on the number and relationship of actual dependents, but is distributed, in case of no will, in accordance with the intestate law of the State.

The maximum in all cases, including death, is $10 per week for 300 weeks, except in case of total permanent disability, when payment is extended to 400 weeks.

This bill applies to all employments, including domestic service, the only exception being "casual employments."

Compensation and New Legal Status Go Together

SECTION III.—This section deals principally with definitions, but aside from these has one paragraph to which the commission attaches great importance—*i. e.*, a proviso that sections I and II are declared to be inseparable, and if any essential part of either section be declared unconstitutional, so that the whole of such section must fall, the other section must fall with it and not stand alone.

In framing this clause the commission had in mind the situation which exists to-day in Ohio, where a law has been passed which simply removes the employer's present defenses. Laboring under this handicap, the Ohio employers are now striving to influence pending legislation which will provide for workmen's compensation; but, of course, they cannot hope to wield as much influence as before the defenses were abrogated.

The New Jersey Commission, while unanimously of the opinion that the two defenses of "fellow servant" and "assumption of risk" should be entirely abrogated, and that of "contributory negligence" materially modified, have tried to deal with the whole subject in a practical and businesslike manner, by incorporating in the same bill the removal of these defenses and the schedule of compensation. Their aim has been, not to strip the employer of his defenses without giving him a harbor of refuge, and by the proviso mentioned these two ideas are made to stand or fall together.

The one weak point in most of the legislation proposed in the various States, including New Jersey, is the fact that, in the last analysis, the payment of the compensation, even after the amount has been agreed upon, is dependent on the continued solvency of the employer. This condition will probably be met, partly at least, by legislation permitting the transfer of the liability to the company insuring the employer, providing that such company is approved by the State Commissioner of Insurance.

Reasons for Employers' and Employees' Election

The commission confidently expects that the elective section of the act will be generally accepted by both employers and employees, for the following reasons:

By the employer:

1. Because his liability is limited and he is thus relieved of the danger of harassing lawsuits for excessive damages.

2. By reason of the abrogation of two defenses and modification of another the position of the employer who refuses to accept the elective law will be less tenable.

3. Because he can in a large measure add the expense to cost of manufacture and recover it in his selling price.

4. Because he can readily insure his liability.

By the employee:

1. The practical certainty of settlement in accordance with the schedule, as against the uncertainty of an appeal to common law rights.

2. Promptness in settlement, as against the "law's delay."

3. All the money is paid to the injured person, as against the heavy attorney's fees and court expenses of the suit at law.

Protection by Insurance

In the various hearings on the proposed bill the one feature which has impressed me most has been the evident fear on the part of the small manufacturer or employer that the bill will impose unusual burdens on him. It seems to me that the answer to this is that he can protect himself by insurance. That the cost of insurance under existing systems is excessive I believe to be true, but that is not the worst feature. Heretofore the aim of the employer has been to seek by insurance to minimize the outlay, and the welfare of the injured or his dependents has not been a factor in the problem. The present system simply shifts the fight against the injured employee from the employer to the insurance company, which throws the whole force of its trained legal organization and its financial resources against the inexperienced, ignorant or otherwise helpless injured employee. In fact, the whole aim of the insurance companies has been to use every legal device to avoid payments to victims of accidents. That they have been fairly successful in attaining this object would seem to be indicated by the report of the New York Commission, which shows from statistics of nine companies that on an average only 36.34 per cent. of that which employers pay in premiums is paid in settlements of claims and suits. This is clearly a great economic waste.

MUTUAL ACCIDENT COMPANIES.

The remedy lies in the organization of one or more mutual accident insurance companies, conducted along the lines that have been so conspicuously successful in the factory mutual fire insurance companies which have been operating for the past 60 years in New England. The first purpose of these companies has been to prevent fires. They not only advise their members just what must be done to prevent fires by methods of construction and maintenance, but they go further and refuse to admit to membership any factory which will not conform to their high standards.

The result has been a reduction in the cost of fire insurance from $2.50 per $100 to 7.17 cents, which latter figure is the average yearly cost for the past 13 years. The adoption of this system will fully protect the small employer, and will at the same time attack the problem at the right end by reducing the number of accidents, which, after all, is the great desideratum.

I venture the opinion, with all due respect to our friends the insurance men, that in the near future it will be repugnant to an aroused and enlightened social conscience that the insurance of injured workmen should be a source of profit to any one.

A Pennsylvania Bill Follows the New Jersey Plan

Imitation is the sincerest form of flattery. I have here a draft of an act which, within the past week, has been presented to the Pennsylvania Legislature by men affiliated with the labor interests of your State. This act is practically a duplicate of the New Jersey one, the only changes being minor ones to make it conform to the local conditions.

The New Jersey bill is probably the most advanced legislation on this subject in this country. Personally, however, I am convinced, from my study of the subject, that even this bill, while a distinct advance, does not provide a permanent solution of the problems involved. This, in my judgment, must come through a system of State insurance, which shall be compulsory both on the employer and the employee. Before such a plan can be adopted in this country the federal and State constitutions must be amended.

The Mason Engineering & Mfg. Company, recently organized, will erect a plant at West Middlesex, Pa., for the manufacture of water heaters. The building will be of brick and concrete, and the company expects to begin manufacturing about August 1. Frank Large, Sharon, is president; Joseph Metz, West Middlesex, vice-president; Charles Pierce, Sharon, treasurer; William E. Elliott, Sharon, secretary.

The offices of the Pittsburgh Supply Company have been removed from the Frick Annex Building to the Jenkins Arcade Building, Pittsburgh, Pa.

Employers' Liability and Workmen's Compensation*

A Review of the New Jersey Law and Its Elective Feature—The Question of Insurance

BY WM. B. DICKSON.†

In discussing the subject of "Employers' Liability and Workmen's Compensation" I will not attempt to review the past nor to indicate the steps by which this important subject has been brought so prominently before the American people. The evils of the old system are generally recognized and admitted by intelligent employers. That public opinion has been thoroughly aroused is evident from the fact that in 10 States commissions have been appointed by the Governors or Legislatures to study these questions and recommend legislation.

In April, 1910, Governor Fort of New Jersey, acting under a joint resolution of the Legislature, appointed a commission to inquire into and recommend legislation on the subject of employers' liability. This commission, of which I had the honor to be president, was composed of two employers, two representatives of labor and two legislators, one each from the House and the Senate. In January of this year the commission presented its report, accompanying it with a proposed bill on employers' liability and workmen's compensation. This bill passed in the Senate by a vote of 16 to 1 and on Monday of this week passed in the House by the remarkable vote of 54 to 0, and was signed by Governor Wilson on Tuesday, April 4.

New Jersey has thus given a notable lesson in nonpartisan legislation. The commission was appointed by the Republican Governor Fort. The commission's bill was passed by a Republican Senate by a vote of 16 to 1 and then by a Democratic House by a vote of 54 to 0. Last, but not least, it was signed by that great representative of true Democratic principles, Governor Wilson. I am by tradition a Republican, but if the Democratic party can produce and will sustain leaders such as Governor Wilson in New Jersey and Francis Lynde Stetson in New York, I can imagine no more inspiring career for the young man, ambitious to serve his country, than to fall in behind and keep step with such men.

The bill, which is divided into three sections, may be briefly outlined as follows:

Changes in Previous Laws

SECTION I.—This section deals entirely with modifications of the present law. It retains the proviso that the negligence of the employer must be shown to have been the natural and proximate cause of the injury. This proviso was retained, not because the commission did not believe in compulsory compensation, but because the weight of legal opinion received in reply to inquiries was against the constitutionality of any plan whereby an employer would be compelled to compensate an injured workman regardless of his (the employer's) fault or negligence. The wisdom of this conclusion has since been demonstrated by the recent decision of the New York courts declaring the New York act in this respect to be unconstitutional, even in the hazardous trades.

The New Jersey elective scheme differs from that of New York in an essential feature, in that the election must be made at the time of hiring, whereas in New York it is made after the accident. As a result, I am informed that the New York law has been practically a dead letter, as the workmen have naturally elected to sue under common law rights. In New Jersey, if the workman at the time of hiring refuses to accept a compensation law which the Legislature has declared to be equitable, the employer can refuse to hire him, and in doing so will no doubt be sustained by public opinion.

Section I, however, modifies the present law of employers' liability by entirely abrogating the two old defenses usually known as "fellow servant" and "assumption of risk." It also modifies the law of "contributory negligence" by providing that the employer must prove that the negligence of the employee was "willful." This term is defined in the bill as: (1) Deliberate act or deliberate failure to act, or (2) such conduct as evidences reckless indifference to safety, or (3) intoxication.

It will be observed that this section deals entirely with the liability of the employer and, standing alone, strips the employer of those defenses which in the past have been of the greatest value to him in defending suits at law.

The members of the commission were unanimous in their opinion that, regardless of any other legislation, the above modifications in the present law should be made, for the following reasons:

1. The defense of "fellow servant." In the great majority of cases the employee has no voice in the selection of his fellow servants, and the mere fact of having the same employer should not in itself release the employer from a liability which he would otherwise incur.

The injustice of this rule may be illustrated thus: An accident occurs, due to the act of an employee, which results in the injury of a fellow employee and also of an outsider in no way connected with the work. The outsider may and often does secure redress, while the employee is barred solely on account of his being a fellow servant.

2. The defense of "assumption of risk." While theoretically a workman may be presumed to have a choice in the selection of his employment and to have carefully weighed the risks naturally inherent therein before going to work, as a matter of fact in the vast majority of cases the choice is narrowed down to the acceptance of such risks or no work. In this connection the objection has been made by some employers that for extra hazardous work extra wages are paid. An instance was cited where riveters in a shop were paid $3 per day, while men doing the same work in the erection of high steel buildings were paid $6. The commission's view of this objection was that in the case of the workman on the high building he was placing his life and limbs in jeopardy every minute of the day, and this should be a sufficient offset to the extra wage without asking him to throw in the scale also the future welfare of those naturally dependent on him.

3. The defense of "contributory negligence." The commission recognized the fact that this defense is founded on principles of justice. As the law now stands, however, any degree of negligence on the part of the employee was sufficient to bar his action, even though the employer was also guilty of negligence. In order to prevent injustice by the nonsuiting of an injured employee on a mere technicality—*i. e.*, where his negligence is relatively trivial—the commission incorporated in its proposed bill a provision that the employer must prove "willful negligence" on the part of the employee.

In suggesting these modifications in the present law the commission intended primarily to abolish these obsolete defenses because of their inherent injustice. Incidentally, however, the removal of these defenses leaves the employer in a less tenable position in ordinary suits at law, and he will therefore naturally be more willing to assent to the provisions of Section II.

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Modern Shop Management*

The Problem of Increasing the Returns of Both Employer and Employee on an Ethical Basis—Fundamentals of Efficiency

BY DAVID VAN ALSTYNE.†

However impracticable the programme of socialism may be, it seems to me that we are drifting toward community interest and government control and ownership with all its inefficiency and awkwardness, and will continue to, unless the employing class, which is the money-making class, can be made to realize that to whatever extent its moneymaking is detrimental to the community as a whole, it is simply encouraging the spread of socialistic tendencies. Sooner or later organized labor will find politics its most effective weapon and its tendency will be socialistic.

Present management of "big business" is probably not much more efficient or freer from evils than government management, but the possibilities of individual control are far greater than those of community control and must be realized if we are to escape the latter.

Among the potent factors for progress in our own social organization perhaps the most potent are the employers of labor, the managers of men. Competition forbids employers doing more for their employees than their competitors; rather inclines them to do less. So that if reforms are to be accomplished they must be accompanied by greater profits. The chief interest the employer should have in the welfare of his employees is to enable them to earn more than his competitors' employees are able to earn.

All other interests are incidental and will be largely taken care of by the employees themselves if they have the money with which to do it. Therefore the social reformer who would effect his reform through the employer is confronted with the task of increasing the employees' wages and at the same time increasing the employer's profits. It is the instinctive desire of every employer to promote the welfare of his employees to the fullest possible extent as long as it does not interfere with his profits. His philanthropy and good will do not extend much beyond this.

A small concern managed by a man of ability is likely to be fairly efficient because most of the details can be kept under his personal observation. As the business grows it becomes necessary for him to leave it more or less to his subordinates. That part of the business which he is most interested in or best acquainted with will continue fairly efficient; the rest dropping to an efficiency commensurate with the ability of those immediately in charge. When it reaches the magnitude of our large railroads and industrials, the chief executives are almost wholly out of touch with the details of the business and with the individuals of the rank and file.

System, Not Leadership, the Important Thing

In proportion as the magnitude of the business increases, the importance of the personality of the leader decreases and that of the system and organization through which he exercises his personality increases. It is through a systematic control of employees of the rank and file that he reduces waste of time and material, rather than through his personal influence over his immediate subordinates. The measure of the efficiency of an organization is the extent to which the enthusiasm of the individuals in it is maintained through the organization and not through the personality of the men at the head of it.

Few men in positions of great executive responsibility realize how little influence they exert on the business under them. It is not a serious exaggeration to say that the difference between the results obtained by an average manager and one who is known as an exceptionally able man is not material; and whether the result is good or bad is largely accidental in so far as the man in charge is concerned, and chiefly due to conditions surrounding the business.

The conventional manager depends upon cut and dried expedients rather than scientific standards or ideals. His methods are based more on superficial observation and haphazard opinion than on the fundamental laws governing his business. Failure to accomplish the results he hopes for is not, in his opinion, a criticism of his methods but rather calls forth his regret at the passing of the good old times when men were less independent and indifferent or conditions otherwise more favorable.

Managers of the New Type Scarce

There is as much or more organizing ability now than there ever was, but through the consolidation of many small concerns into a few large ones, great responsibility is being put upon a few men who are not trained for it. The jobs have grown faster than the men.

Of promotors or "captains of industry," whose farsightedness indicates where development is needed and where money can be made, there is no lack; but managers who will patiently standardize each detail in the operation of their business and get the maximum out of it, are exceedingly scarce.

Under detail-control management as little as possible is left to individual judgment, but the movements of every man, every piece of material and the expenditure of every dollar are guided according to a prearranged schedule.

If the objection is made that guiding every move men make makes machines of them, destroys their initiative, the answer is that there is not much initiative to destroy and that the best results are obtained for both employer and employee when men are worked like machines and treated like men. In large organizations they are more likely to be treated like machines and allowed to work as their own individual fancy dictates.

Not the least asset created by the management which has accurate record of the individual, is the impression made upon the employee that the highest officials know of him personally, that he is less subject to the whims and prejudices of his immediate superior and that he is recognized as an essential part of the organization which arouses an enthusiasm that cannot be too highly valued. The organization created by this control of details is of vastly greater importance than the facilities or equipment. The good organization will obtain good results with poor equipment, but the poor organization will obtain poor results no matter how good the equipment may be.

Conventional vs. Detail Management

Under conventional management the foreman, or man immediately in charge, has a fair technical knowledge but usually little organizing ability. The multitude of details under his jurisdiction receive his attention a few at a time, the others drifting along according to the fancy of the individuals handling them. The few details receiving the attention of the foreman are brought up to a standard proportionate to his skill and knowledge, and begin to drop again as soon as he returns his attention to some of the other details. The result is to confine attention chiefly to those details which seem of most importance and to let the rest drift along as they will. Hence, average output per dollar expended for labor and

* Extracts from a paper read before the Congress of Technology at Boston, April 11, 1911, at the fiftieth anniversary of the Massachusetts Institute of Technology.

† Vice-president Allis-Chalmers Company, Milwaukee, Wis.

material is small and must continue so as long as so much depends upon the efforts of one man.

Under detail management an investigation of the possibilities of each operation and each pound or foot of material is made and a standard set per unit of output. These investigations are made and the standard set by experts each in his own line. Records giving a continuous comparison of each detail of labor and material with its standard indicate which are satisfactory and which need attention.

The value of establishing a standard or measuring stick for every detail cannot be overestimated. It not only gives the manager a feeling of security in his knowledge as to exactly how his affairs stand and as to what needs his concentrated attention, but also gives his subordinates something definite to work for and arouses their enthusiasm, especially when extra pay is given for reaching the standard.

Fundamentals of High Efficiency

Fundamental principles in reaching high efficiency are:

1. Records. An accurate record of each detail, or group of details, of labor and material. A record should be looked upon as a working tool and its value measured by its capacity for producing lower cost and greater output.

2. Standardized conditions. This involves putting the equipment into such condition as will make maximum output and most economical operation possible.

3. Standardized quality. The determination of a standard of quality of output or efficiency of service below which it is not permissible to go, is necessary because efforts to reduce cost and increase output may result in lowering the quality unless systematically prevented.

4. To find out what is to be done and how to do it. This involves stripping the work of all unnecessary refinement, finish, material and operations, bearing in mind that what is worth doing at all is worth doing well enough for its purpose and not a bit better, and then determining the simplest and quickest method of doing it with the facilities at hand and establishing a time or cost limit.

5. Written instructions as to the standard method of reaching the required time or cost. Such instructions constitute a textbook of the business and are not to be deviated from. Employees should be constantly checked on their knowledge and close observance of instructions, otherwise the instructions are rarely fully understood and are quickly forgotten or ignored.

6. Constant comparison of actual performance with standard to see that the actual reaches the standard and continues there. It is not essential that allowances, standards or ideals should be ultimate or represent the highest state of the art; in fact such standards may appear to be so hopelessly impossible of attainment as to be undesirable for present purposes. The standard should be set as far ahead of present practice as is practicable. The ideals of to-day are the only ones we are immediately interested in reaching though they may be the practice of to-morrow, and it then becomes necessary to set up new ideals.

The essential thing is to see that whatever ideals are set are reached, and that as long as they are not changed there shall be no falling away from them. This is the principle which is most neglected by managers and at which usual management fails. It is easy to establish rules and standards, but it is not easy to have them lived up to continuously. Unless the organization provides for comparing in detail what it does with what should be done, with mathematical accuracy, a high efficiency cannot be maintained. It is a common experience for a concern to reach a good efficiency during dull business and to drop to a low efficiency during heavy business because the management has so little control over details.

These principles are a decided recognition of the capacity of the individual and may be considered antagonistic to some of the expressed principles of organized labor. . . . .

The usual form of trade agreement which binds the employer to pay fixed rates per hour, day or week and the employee to put in his time and produce whatever the employer is able to get out of him is economically wrong, because one-sided and indefinite. Each has his opinion as to what constitutes a fair day's work, which the employer will constantly try to increase and the employee tend to decrease.

What one employer may consider a fair output may be too little for another employer and more than required by a third. It is to the interest of both employer and employee to agree upon a reasonable time for each operation, so that each may know definitely what he is to expect from the other.

An agreement which binds the employee to a definite output as well as the employer to definite working hours, rates of wages, &c., is a safeguard for both parties.

. . . During the recent period of great commercial activity many complaints were heard of the difficulty in getting skilled men; many employers claiming that the unions were making men indifferent and independent and through various restrictions, preventing the development of a sufficient number of skilled men to supply the demand.

I am inclined to think that to a certain extent this may have been true and that it was largely the fault of the employer for permitting it. The influence of the unions, however, in this direction is limited and only indirectly the result of their efforts to better their conditions. The chief cause of the scarcity of skilled labor is the extreme fluctuations in business, creating at one time an abnormal demand and at another throwing both skilled and unskilled labor out of work.

There are more skilled men and there is skill of a higher order than ever before; but by the nature of things their number is more or less adjusted to the average demand. There is always available a nucleus of those good men who have comparatively steady work and during times of extreme activity the only men available are those who spend a considerable portion of their time in idleness. In times of great activity there is no good opportunity to train this generally unemployed increment, and in dull times idleness encouarges laziness, indifference and a loss of the little skill men acquire while at work. We are inconsistent in throwing as many men as possible out of work as soon as business begins to decline and then complaining that they are not capable of the highest efficiency when they are employed.

In my opinion this is the greatest evil for which our present social system is responsible, and it is also the most difficult to regulate. Apprenticeship, trade schools and like efferts to train skilled workmen are all good to a certain degree, but their influence is insignificant as compared with the influence of long periods of enforced idleness to which the laboring class is subjected.

It is to be hoped that some day it may be found practicable for the law to require employers to take care of a certain portion of their idle employees during periods of depression, and the government to give employment to the rest on public improvements.

It is encouraging to note the number of concerns which are introducing old age pensions, profit sharing, &c. It is to the pecuniary interest of the employers to do those things themselves rather than to wait for them to be done by the government with its inevitable inefficiency.

The Value of Welfare Methods

Every large employer of labor can afford to have what might be called a "sociological department," whose duty it would be to look to the welfare of its employees, so long as it is not done in a patronizing manner. Such a department should keep a personal record of each employee, consisting of whatever information of value is obtainable, to be used in deciding as to desirability as an employee, eligibility for promotion, instead of depending on haphazard opinions which are usually superficial and biased. It would also keep as closely in touch as possible with employees to find out what secret grievances they are brooding over, due to brutal, prejudiced and partial treatment by superiors and be ready to lend a helping hand in case of misfortune, sickness or death. Apprenticeship, pensions, profit sharing, prevention of

accidents and hospital service might also properly come within the jurisdiction of this department.

Having in mind that the large employer will not attain highest efficiency which will continue indefinitely until he produces as closely as possible the personal relationship between superior and subordinate which exists in the case of small employers, it would seem that the best way to accomplish it is through a department created for the purpose. This department would, in the long run, be one of the most effective in increasing net earnings.

Financial Control May Be an Obstacle

The speculative financial influence is a serious obstacle to the progress of better management and, in consequence, to its own interests. Not only does it not understand the human element in its business, which is the important element with a large employer of labor, but being in control it usually dictates a narrow, opportunist sort of policy based on superficial opinion rather than scientific investigation. It cannot see that a moderate investment in better organization and management will, in nine cases out of ten, save a large investment in equipment, besides reducing the cost of the operation. As a result, executives, no matter how well intentioned, are afraid to depart from the narrow conventional limits prescribed, so that "big men" are not developed for the "big" positions.

Little improvement can be expected until the average board of directors takes more interest in the business it directs and becomes more intimately acquainted with the details. It would seem that one way to accomplish this would be to have each department board report direct to the board instead of through the president, who as a rule is a specialist in only one department. It would also seem advisable for the board to have specialists report on the efficient operation of all departments in the same manner as chartered accountants report on the accounting department.

For those who have the courage to break away from some of the old traditions and conventional methods there is an unlimited field. The difficulties are great, but the possibilities are greater. The results are conspicuously good. It is strange but true that it should be difficult to persuade the owners of a property to accept greater profits with small investment. It is equally true that the scientific manager will find it more difficult to educate his superiors than his inferiors. A proposition to invest one dollar to save ten is frequently less attractive than a proposition to invest ten dollars to save one, because it is unconventional.

Most men seem to have a genius for seeing things as they want to see them, not as they are, and for fixing their attention on non-essentials. To make real progress, such characteristics must be overcome, and the one and only way it can be done is to show how much more profitable is a policy based on scientifically accurate knowledge.

The science of management is in a very undeveloped state, but progress is being made and another generation or two will look back upon the methods of to-day as exceedingly crude.

Iron Ore Docks on the Lakes

Details of Capacity and Construction, with Recent Additions

W. A. Clark, chief engineer of the Duluth & Iron Range Railroad, Duluth, has made a new compilation of data of the iron ore shipping docks on Lake Superior and Lake Michigan. It is revised to May 1, 1911, which is the nominal opening of the navigation season, and thus includes all the additions that have been made in the past year or that are now under construction. Herewith appears a reproduction of Mr. Clark's chart, which makes an impressive showing of the ore handling capacity of the upper lake docks.

RAILROAD	LOCATION	DOCK NO.	NUMBER OF POCKETS	STORAGE CAPACITY TONS	HEIGHT, WATER TO CENTER HINGE HOLE	HEIGHT, WATER TO DECK OF DOCK	WIDTH OF DOCK OUTSIDE TO OUTSIDE OF PART'N POSTS	LENGTH OF SPOUTS	LENGTH OF DOCK	ANGLE OF POCKETS	CU. FT. PER POCKET TO BOTTOM OF STRINGERS
CHICAGO & NORTHWESTERN RY.	ESCANABA, MICH.	1	184	21143	28'10"	48'6"	37'0"	21'0"	1104'	39° 30'	1918
" "	"	3	286	28792	31'2"	52'8"	37'0"	27'0"	1356'	45° 0'	1969
" "	"	4	250	34925	36'6"	59'2"	37'0"	30'0"	1500'	45° 0'	2191
" "	"	5	370	120158	37'9⅜"	70'9⅜"	52'2"	32'1½"	2220'	45° 0'	4142
" "	"	6	320	69760	40'0"	70'0"	50'2"	30'0"	1920'	45° 0'	4114
" "	ASHLAND, WIS.	1	234	42120	40'0"	70'0"	50'2"	30'0"	1404'	45° 0'	3915
" "	"	2	234	42120	40'0"	70'0"	50'2"	30'0"	1404'	45° 0'	3915
	TOTAL		1818	359918							
DULUTH & IRON RANGE RAILROAD	TWO HARBORS, MINN.	1(a)	208	56507	39'3"	74'0"	51'8"	34'0"	1376'	48° 00'	4075
" "	"	2	208	41600	33'5"	57'6"	49'0"	27'0"	1280'	38° 42'	3006
" "	"	3	170	34000	40'0"	66'0"	49'0"	27'0"	1054'	43° 32'	3006
" "	"	4	168	36960	37'0"	62'0"	49'0"	29'0"	1042'	38° 42'	3270
" "	"	5	168	35450	39'0"	66'9"	49'0"	30'0"	1050'	43° 32'	3126
" "	"	6(b)	148	43946	40'0"	73'0"	51'3⅝"	33'4"	920'	45° 00'	4272
	TOTAL		1070	247763							
DULUTH, MISSABE & NORTHERN RY.	DULUTH, MINN.	2	384	69120	32'0"	57'6"	49'0"	27'9"	2336'	45° 0'	2368
" "	"	3	384	80640	40'7"	67'1⅛"	50'0"	27'9"	2304'	45° 0'	2782
" "	"	4	384	119274	41'5⅝"	72'6"	57'0"	30'1⅛"	2304'	45° 0'	3307
	TOTAL		1152	269034							
GREAT NORTHERN RY.	SUPERIOR, WIS.	1	374	100980	40'0"	73'0"	62'8"	32'4"	2244'	45° 0'	4972
"	"	2	350	94500	40'0"	73'0"	62'8"	32'4"	2100'	45° 0'	4972
"	"	3	336	88080	40'0"	73'0"	62'8"	32'4"	1956'	45° 0'	4972
"	"	4(c)	302	106304	40'2"	75'0"	62'6"	34'6"	1812'	47° 30'	5347
	TOTAL		1352	389804							
DULUTH, SOUTH SHORE & ATLANTIC RY.	MARQUETTE, MICH.	4	200	28000	27'9"	47'3"	36'8"	21'1"	1200'	39° 45'	1839
" "	"	5	200	50000	40'0"	70'10"	51'0"	32'4"	1236'	45° 0'	3848
	TOTAL		400	78000							
LAKE SUPERIOR & ISHPEMING RY.	MARQUETTE, MICH.	1	200	36000	30'9"	54'0"	50'0"	27'2"	1232'	36° 49'	2713
" "											
MINNEAPOLIS, ST. PAUL & SAULT SAINTE MARIE RY.	ASHLAND, WIS.	1	314	48356	40'0"	66'2"	36'0"	27'0"	1908'	50° 45'	2435
" " "	SUPERIOR, WIS.	1	100	30000	43'5⅜"	78'0"	58'0"	32'1½"	600'	47° 00'	4775
	TOTAL		414	78356							
CHICAGO, MILWAUKEE & ST. PAUL RY.	ESCANABA, MICH.	1	240	50400	40'2⅝"	66'6"	52'0"	120 - 27'0" / 120 - 30'0"	1500'	45° 0'	2900
" " "	"	2	240	63800	40'11⅜"	69'2"	54'0"	30'4½"	1500'	45° 0'	3150
	TOTAL		480	113900							
ALGOMA CENTRAL & HUDSON BAY RY.	MICHIPICOTEN, ONT.	1	12		34'0"	45'4"	25'0"	22'6"	311'9"	44° 0'	
CANADIAN NORTHERN & ONTARIO RY.	KEY HARBOR, ONT.	1(d)	20	2000	41'5"	61'9"	28'0"	30'0"	240'0"	37° 30'	2315

Record of Ore Docks on the Great Lakes.

The Struthers Furnace Company has authorized the construction of a gas cleaning plant at its furnace at Struthers, Ohio, for which plans are being prepared by Julian D. Page of Youngstown, formerly with the W. B. Pollock Company.

Handling Philadelphia's Ore Imports

The largest vessel built abroad for the transatlantic ore trade, the steamship Tellus, arrived April 7 at Philadelphia, on her maiden voyage, with a cargo of 11,600 tons of Swedish iron ore from Narvik, Norway, consigned to the Warwick Iron & Steel Company, Pottstown, Pa. The vessel left Narvik March 19, and the voyage of some 3650 miles was uneventful, the ship proving itself to be a good sea boat.

The Tellus was designed as a general bulk cargo carrier and was built and engined by William Doxford & Sons, Ltd., Sunderland, England. She is 445 ft. long, 60 ft. wide, has a molded depth of 31 ft. 6 in. and a draft of 28 ft. 6 in., is built of steel and has a shelter deck extending the full length of the vessel. Her carrying capacity is rated from 12,000 to 13,000 tons, the area of the holds aggregating 556,040 cu. ft. There are four holds, No. 1, forward, being 67 ft. long; No. 2, 139 ft.; No. 3, 65 ft., and No. 4, aft, 76 ft. Water tanks for ballast, with a capacity of 3370 tons, are provided, 1800 tons of which are carried in side tanks, located between the shelter and main decks and extending the full length of the vessel, the remainder being carried in bottom tanks. Large hatchways extending through the shelter and main decks provide easy access to the holds. The hatchways to the Nos. 1, 3 and 4 holds measure 36 by 30 ft., while the No. 2 hold has two hatchways, one 36 by 30 and one 32 by 30 ft. For unloading purposes, derrick hoists are located at each hatchway, the hoists being operated by steam winches, of which there are 11.

The engine, triple expansion, is located amidship. It has cylinders 27½, 44½ and 76 in. in diameter, and a stroke of 51 in., developing 3000 hp. The boiler installation includes three marine boilers, 17 ft. 6 in. by 11 ft. 3 in., with nine funaces 4 ft 7 in. in diameter. The bunker capacity is 1257 tons of coal. The vessel is owned by Wilhelm Wilhelmsen of Tronsberg, is under command of Capt. Karl Andersen, has been chartered for a term of nine years by the Nova Scotia Steel & Coal Company, and will be used in the transportation of Wabana ore, both in the transatlantic and Atlantic Coast trade.

The New Philadelphia & Reading Ore Pier

The Tellus was the first to discharge a full cargo at the new ore pier of the Philadelphia & Reading Railway Company at its Port Richmond wharves, Philadelphia. This pier, which has been erected for some time, but delayed in operation by the noncompletion of the power apparatus, has two unloading units, which represent one-half of the ultimate plant. The installation was made by the Brown Hoisting Machinery Company, Cleveland, Ohio, and represents the electrically driven "fast plant" unloading machinery designed by that company. Each unit has a rated capacity of 300 tons per hour, working with 5-ton grab buckets, but as the machinery was stiff and numerous tests were made with the weighing devices and other parts of the equipment, the cargo was not discharged at much more than 50 per cent. of the rated capacity.

The unloading pier has a width of 69 ft., and the unloading device spans four railroad tracks; the length of the runway on the pier is 650 ft., which will enable two small vessels to be unloaded at one time. A suspended movable weighing hopper of 60 tons capacity, with standard weighing apparatus, serves each unit, the bottom of which is 15 ft. above the railroad tracks. Cars are handled in either direction on three of the tracks on the pier by means of a Dodge system of rope drive, a transfer table at the outer end of the track serving to transfer the cars to the different tracks as desired. One track is given over exclusively to the incoming movement of empty cars.

The arms of the unloaders are 50 ft. above the pier and extend outward, when at operation, 60 ft. from the wharf line, being raised into a perpendicular position when not in use, or when moving from one hold to another, or when a vessel is being docked. All the equipment is electrically driven, and, while handled by inexperienced men, very satisfactory results are said to have been obtained on the first work out of the machines. In a large number of cases weights taken of single bucketfuls showed them to have run well over 20,000 lb. The unloading device will from now on be used for the regular work of unloading at this pier.

Central Station Welfare Work

Plans for Benefit of Electric Light and Power Employees

The Public Policy Committee of the National Electric Light Association, which during the past winter has been devoting considerable attention to the various aspects of welfare work as related to the central station industry, held a final meeting at the New York headquarters in the United Engineering Building, March 28, when the report, which had been prepared through a series of long conferences, was unanimously adopted for presentation to the member companies, in number nearly a thousand, at the annual convention in New York next May.

Several of the companies already have in force some of the schemes proposed, but it is not assumed that every company will wish to adopt every form of relationship outlined in the report. The plan includes accident insurance, sickness insurance and death benefits, service annuities, profit sharing, employees' savings and investment funds, and life insurance, although with regard to the last item it is suggested that the companies limit themselves to providing their employees with all possible information in connection with safe low cost life insurance, and do not put in force any plan of their own.

By unanimous vote the term "pension" has been dropped and the service annuity adopted as the recognition of an automatic recompense for continuous service, and the committee is of the opinion that member companies should provide such annuities for every male employee reaching the age of 65 and every female employee of 60 years, after continuous and satisfactory record of 10 years of service. The details of profit sharing are based upon the idea that it is better to have those engaged in the industry as partners than employees and that preferably profits of the employee based upon his wage scale should reach him in the securities of his company, and that dividends upon such securities should be paid in cash, in the manner customary with other security holders. Details are also given with regard to savings funds and investment funds, with the object of promoting thrift among employees and, where feasible, combining the plan with profit sharing, it having been found that the two work out very satisfactorily together.

The personnel of the committee is: Charles L. Edgar, chairman, president Edison Electric Illuminating Company, Boston, Mass.; Nicholas F. Brady, vice-president New York Edison Company; Charles A. Stone, Stone & Webster Corporation, Boston; H. M. Byllesby, Byllesby & Co., Chicago; Henry L. Doherty, president Denver Gas & Electric Company; W. W. Freeman, president National Electric Light Association and vice-president Brooklyn Edison Company; Samuel Insull, president Commonwealth Edison Company, Chicago; Joseph B. McCall, president Philadelphia Electric Company; Samuel Scovil, vice-president Cleveland Electric Illuminating Company; Gen. George H. Harries, vice-president Washington Railway & Electric Company; Everett W. Burdett, counsel of the association, and Arthur Williams, New York Edison Company, vice-chairman of the committee. The committee has also enjoyed the active co-operation of Thomas E. Murray, president Association of Edison Illuminating Companies; W. H. Blood, Jr., and R. S. Hale.

It is believed that it is the first time in the history of the country that an association having in its membership so many corporations, and representing over 90 per cent. of the investment and earnings in the industry for which it stands, has taken up such a subject in this comprehensive and thoroughgoing manner, and the report itself will be awaited with the utmost interest by all connected with public utilities and by economists in general.

Tariff Revision Begun

The Proposed Free List Extension

The first bill introduced in the House of Representatives by Chairman Underwood of the Ways and Means Committee was presented April 12 and is generally called the free list bill. It is an omnibus measure to meet the demands of various sections of the country where the sentiment is strong against the Canadian reciprocity bill because it omits from its provisions many articles that enter into general consumption. This free list bill, it is believed by the Democratic leaders and by the progressives, will satisfy the insurgents who refused last session to support the reciprocity bill. The enacting clause provides that it shall go in effect on the day following its passage, when the following named articles will be exempt from duty:

"Plows, tooth and disk harrows, headers, harvesters, reapers, agricultural drills and planters, mowers, horse rakes, cultivators, threshing machines and cotton gins, farm wagons and farm carts, and all other agricultural implements of any kind and description, whether specifically mentioned herein or not, whether in whole or in parts, including repair parts.

"Bagging for cotton, gunny cloth and all similar fabrics, materials, or coverings suitable for covering and baling cotton, composed in whole or in part of jute, jute butts, hemp, flax, seg, Russian seg, New Zealand tow, Norwegian tow, aloe, mill waste, cotton tares, or any other materials or fibers suitable for covering cotton and burlaps and bags or sacks composed wholly or in part of jute or burlaps or other material suitable for bagging or sacking agricultural products.

"Hoop or band iron, or hoop or band steel, cut to lengths, punched or not punched, or wholly or partly manufactured into hoops or ties, coated or not coated with paint or any other preparation, with or without buckles or fastenings, for baling cotton or any other commodity, and wire for baling hay, straw, and other agricultural products.

"Grain, buff, split, rough and sole leather band, bend, or belting leather, boots and shoes made wholly or in chief value of leather made from cattle hides and cattle skins of whatever weight, or cattle of the bovine species, including calf skins, and harness, saddles, and saddlery, in sets or in parts, finished or unfinished, composed wholly or in chief value of leather; and leather cut into shoe uppers or vamps or other forms, suitable for conversion into manufactured articles.

"Barb fence wire, wire rods, wire strands or wire rope, wire woven or manufactured for wire fencing, and other kinds of wire suitable for fencing, including wire staples.

"Beef, veal, mutton, lamb, pork, and meats of all kinds, fresh, salted, pickled, dried, smoked, dressed or undressed, prepared or preserved in any manner; bacon, hams, shoulders, lard, lard compounds, and lard substitutes; and sausage and sausage meats.

"Buckwheat flour, corn meal, wheat flour and semolina, rye flour, bran, middlings and other offals of grain, oatmeal and rolled oats, and all prepared cereal foods, and biscuits, bread, wafers, and similar articles not sweetened.

"Timber, hewn, sided or squared, round timber used for spars or in building wharves, shingles, laths, fencing posts, sawed boards, planks, deals, and other lumber, rough or dressed, except boards, planks, deals, and other lumber of lignum vitæ, lancewood, ebony, box, granadilla, mahogany, rosewood, satinwood, and all other cabinet woods.

"Sewing machines and all parts thereof.

"Salt, whether in bulk or in bags, sacks, barrels, or other packages."

The new steel plant of the Upson Nut Company, Cleveland, Ohio, was placed in partial operation April 12, two of the four open hearth furnaces and the blooming mill being started. The bar mill will not be ready for operation until about June 1.

The Pittsburgh Steel Company's Finances

The Pittsburgh Steel Company reports to the New York Stock Exchange for the year ended June 30, 1910, and six months ended December 31, 1910, as follows:

	Twelve months to June 30, 1910.	Six months to December 31, 1910.
Sales	$11,506,005	$5,137,817
Inventory of finished goods at end of period	840,090	1,200,246
Totals	$12,346,095	$6,338,063
Deduct:		
Inventory of finished goods at beginning of period	675,176	840,000
Materials used and cost of operations (including repairs and maintenance of plants)	9,311,938	4,433,864
Balance	$2,358,979	$1,064,108
Selling and general expenses	1,103,167	594,240
Balance	$1,255,811	$469,868
Miscellaneous income (net)	28,782	6,685
Total income	$1,284,593	$476,554
Interest charges	369,672	174,028
Net earnings	$914,921	$302,525
Common dividends	479,520	239,880
Surplus profits	$435,401	$62,645

The general balance sheet as of December 31, 1910, is as follows:

Assets.	
Real estate, buildings, plant and machinery (patent rights not valued)	$13,251,194
Stocks of subsidiary companies	330,000
Cash	886,575
Accounts receivable (net)	1,554,483
Notes receivable	105,948
Loans and advances	843,706
Finished product, raw materials and supplies oh hand	2,485,526
Prepaid charges	41,097
Total	$19,498,531
Liabilities.	
Capital stock, preferred	$7,000,000
Common stock	6,294,460
Chicago real estate, bond and mortgage	30,000
Time and demand loans	1,511,197
Accounts payable	1,338,524
Dividends payable January 1, 1911	119,880
Profit and loss	3,204,469
Total	$19,498,531

The Board of Governors of the Exchange acted favorably on the application of the company to list $7,000,000 of its preferred stock.

Railroad Equipment Orders.—The Pittsburgh & Lake Erie Railroad has ordered the 2000 freight cars for which it was recently in the market. The Virginia Railroad is reported to have placed an order for 1000 cars. The Chesapeake & Ohio is reported to be planning to build 1300 freight cars at its shops, but the report is not confirmed. The Grank Trunk is to build 30 cars at its own shop. The Texas Company has ordered 200 tank cars from the American Car & Foundry Company. Recent locomotive orders include 35 for the Western Maryland, 5 for the Florida East Coast and 2 for the Rutland. The Chicago & Northwestern is negotiating with the American Locomotive Company for 30 locomotives.

Recent orders taken by the Buffalo Forge Company, Buffalo, N. Y., for mechanical draft apparatus of considerable size include, among others, the Cambria Steel Company, Johnstown, Pa.; American Smelting & Refining Company, New York, N. Y.; Burgess Sulphite Fibre Company, Berlin, N. H.; Knickerbocker Portland Cement Company, Hudson, N. Y., and several export orders from agents in Germany, Japan and South America. The export business has been particularly active so far this year, with excellent prospects of exceeding any former season.

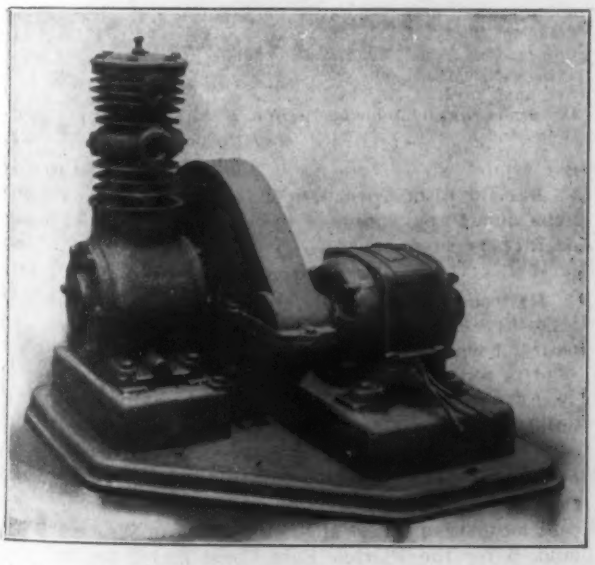
At the Midvale Steel Works, Nicetown, Philadelphia, April 15, eight workmen were killed and several others seriously hurt by the tilting of a ladle of molten steel. Among those killed was George F. Steel, superintendent of open hearth department No. 1.

The Clayton Motor Driven Air Compressor

A small size of motor driven air compressor designed especially for use in automobile garages is being built by the Clayton Air Compressor Works, 115 Broadway, New York City. The special features of this compressor are an inclosed frame, self-oiling bearings and no oil cups or stuffing boxes requiring attention on the part of the operator. The compressor is designed especially for service in garages of moderate size for inflating tires, cleaning cushions and inaccessible parts of the engines and cars, supplying the air blast for brazing or soldering operations, &c.

The machine is of the air-cooled type as water jacketing is not necessary for this class of service, and one of its special features which tends to increase the cooling effect is the fan construction of the driving pulley arms. As will be noticed from the engraving, the compressors are simple and compactly built, and all parts are readily accessible. In operation no adjustment is required, and the operator does not have to give them very much attention. The compressor is of the single-acting type, the air being compressed on the upstroke only. Belt, silent chain or direct connected drive can be used with these machines as they can be supplied with pulleys for belt drive, sprockets for silent drive or couplings for direct connection to electric motors, gasoline and steam engines and water or steam turbines.

If desired this compressor can be used in connection with an air receiver and in this case it is driven by an electric motor. When fitted up in this way an automatic motor starter and stopping device is mounted on the same base with the compressor, and the motor which gives a self-contained unit. Stopping and starting the motor automatically as the pressure in the receiver rises or falls keeps the tank continually full of air at the required pressure and ready for instant use. The compressor is lubri-



A 3½ x 3½ In. Vertical Single Acting Air Compressor with Geared Motor Drive Built by the Clayton Air Compressor Works, New York City.

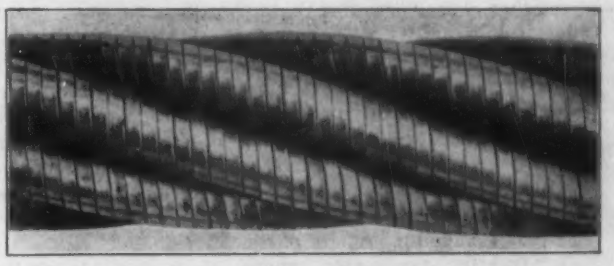
cated from an oil reservoir in the base into which the connecting rod dips and throws oil on all the bearings.

In addition to this unit the company also builds a larger compressor of either single, duplex or triplex type for more extensive and continuous service. This larger machine has water-cooled cylinders and can be fitted to any style of drive or arranged as an independent unit.

The Skinner Engine Company, Diamond Bank Building, Pittsburgh, is making installations of high-speed automatic engines, directly connected to generators, as follows: Municipal power plant, Greenfield, Ohio, two cross compound engines to drive alternating current generators of 200 k.v.a. and one simple engine to operate a 125 k.v.a. generator; Franklin Brewing Company, Columbus, engine to operate a 125-kw. generator; Coal River Coal & Coke Company, Clothier, W. Va., engine to operate a 150-kw. generator; Pittsburgh Bridge & Iron Company, Rochester, Pa., engine to operate a 100-kw. generator; Phœnix Hotel Company, Lexington, Ky., two engines directly connected to 100-kw. generators; Troy Laundry Company, engine to operate a 125-kw. generator.

The Gore Wire Rope

The Waterbury Company, 80 South street, New York City, is manufacturing an improved form of wire rope under patents granted to Thomas Gore. This rope consists of a number of strands made in the customary way from round wire covered by a layer of flat wire. The



An Improved Form of Wire Rope Manufactured by the Waterbury Company, New York City.

strands are intended to take all the strains to which the rope is ordinarily subjected, and the cover is merely for the purpose of protecting these wires from abrasion and exposure and to assist the strands in retaining the grease supplied for internal lubrication and insure greater flexibility. In this way a wire rope has been produced which will maintain its initial factor of safety longer and assure a longer life for the sheaves and drums used in connection with it by changing the corrugated surface to a smooth one.

The rope illustrated is a 3⅛-in. plow steel dredge cable having an approximate breaking strain of 400 tons and weighing 15.9 lb. per foot. It is composed of six outer strands having 61 wires, 0.106 in. in diameter and served with flat wires that are 0.046 in. thick and 0.325 in. wide. The core of this rope is 1¼ in. in diameter and is composed of six strands, having 19 wires in each strand of various sizes to give sufficient strength to withstand the crushing effect of the outer rope. The flat wires are rolled from a cold drawn acid open hearth round bar which leaves the edges convex and prevents the wires from crowding during the flexing of the rope. These flat wires are wound over the strands at an angle of 60 degrees to have them lay transversely to the axis of the rope. In this way when the wires are worn through in the body of the rope, they will not protrude but will pack down into the interstices of the rope and increase its wearing surface.

Frederick Winslow Taylor, the well-known consulting engineer of Philadelphia, ex-president of the American Society of Mechanical Engineers and the originator of the movement known as scientific business management, will make an address on "The New Conception of Business and Industrial Efficiency," in Carnegie Hall, New York, Friday evening, April 28, under the auspices of the Civic Forum. Brief addresses will also be made by John Golden, president of the United Textile Workers of America, on the attitude of organized labor toward this movement, and by Frank B. Gilbreth, on its practical operation. This will be the first opportunity given in New York for the general public to hear a statement of the principles underlying the efficiency movement and their practical application. Details regarding tickets may be obtained at the office of the Civic Forum, 23 West Forty-fourth street.

The furnace of the Napier Iron Works, Napier, Tenn., is now producing at the rate of about 100 tons of iron a day. While it was out of blast in the three months preceding February 13, it was overhauled for repairs.

S. DIESSNER & SONS,
Mechanical and Civil Engineers,
PITTSBURGH, PA.

The National Metal Trades Association

Thirteenth Annual Convention, New York, April 12 and 13

The thirteenth annual convention of the National Metal Trades Association, held at Hotel Astor, New York, April 12 and 13, was the largest and most successful in the history of the organization. The topics considered are vital ones, and able speakers presented papers or entered into the discussion of the subjects in a more informal manner. Employers' liability was argued out in its various aspects as regards workmen's compensation. Industrial education received a fresh impetus by the resolve of the association to assist financially in the employment of an "evangelist," who will attack the work aggressively and in a broad way. Labor efficiency was taken up in this same connection. The new president, F. C. Caldwell, is a strong man, and will carry on the work of his predecessors with the same vigorous enthusiasm and ability.

The reports of President J. H. Schwacke and Treasurer Howard P. Eells showed that the association is in a very prosperous condition. Commissioner Robert Wuest in his annual report said in part:

The Commissioner's Report

Although appreciating the fact that the employers of this country are overorganized, I seriously advise the formation of an American National Federation of Employers, to be composed of representatives of all organizations similar to our own, of which, I understand, there are in the neighborhood of 364 in existence to-day. The maintenance cost of such an organization would be insignificant when compared with the substantial benefits to be derived. For instance, there is no question that the representatives maintained in Washington, D. C., and other fields, as well as the printed matter issued by the various associations of employers are productive of good. Yet it seems to me that the time has come when the formation of such an association as I have briefly outlined is absolutely necessary if we would make lasting progress toward real industrial freedom. For such an association, representing numerically fully as many individuals as are popularly supposed to be represented by that American labor octopus, the American Federation of Labor, would exert such undoubted influence that the employers of this country would receive immediate and positive recognition from our lawmakers, national, State and municipal, and would offer ever present and always needed aid to both employers and employees through the medium of a virilely edited weekly or monthly magazine which would carry with it the authority of a body of magnitude. And, lastly, it would check an enormous waste of money, time and energy by preventing the present duplication of effort and expense.

A matter which should be given most serious consideration, just at this moment, is the taking of proper steps to prevent dynamiting outrages, of which there have been a great number throughout the country in the past 60 days, more in number and greater in audacity than ever before in the history of the United States. It seems to me that all State legislatures should be urged strenuously to adopt stringent laws penalizing the promiscuous sale and storage of dangerous explosives and prescribing, under heavy penalties, the manner in which sellers must keep permanent records of sales of such explosives, and in which purchasers must store same in such places as will eliminate the danger of theft, thus affording the police authorities some slight aid by which they might be able to trace the perpetrators of dastardly crimes of this sort. To-day, under our loosely drawn regulations purporting to govern such sales, no aid whatever is lent to the police in either preventing or detecting projectors of these terrible crimes, now so steadily increasing in number, costliness and fearfulness.

Owing to the insufficient number of operatives reported by our Toledo Branch, the Executive Committee of that branch adopted a resolution dissolving the branch as of February 28, and recommending to its members the retention of their membership with us and the expenditure of their best efforts to secure new members. Commenting on the resolution, the secretary stated that it was his belief that a majority of the members would remain loyal to the National Association and that the future would develop additional members, so that in time they might be able to have a branch which would again be eligible under our constitution and by-laws.

On March 1, 1910, the beginning of our fiscal year, we had 730 members in good standing. In the course of the year 39 applications for membership were favorably acted upon and 31 resignations accepted. There were pending, at the time of the recent meeting of the Administrative Council, which preceded this convention, 16 resignations, all of which were accepted; also 10 applications for membership which were favorably acted upon, making our total membership in good standing at this time 732. The elimination by our Administrative Council of brass molders from our classification is an action of which time will prove the wisdom.

The total number of operatives reported on the basis of the December assessment shows a gain of 5.3 per cent. Our income shows an increase of 42.6 per cent.

The reports of various committees were made by their chairmen as follows: Finance and Joint Committee of the National Metal Trades Association and National Founders' Association, J. H. Schwacke; Industrial Education, Fred A. Geier, and Apprenticeship, E. P. Bullard, Jr.

Industrial Education

Mr. Geier's report resulted in one of the important actions of the convention, the passage of a resolution calling for the expenditure of $5000 to go toward the employment of an "evangelist," whose work will be to further the general cause of increased efficiency of workmen. In his paper, Mr. Geier said:

"In accordance with a resolution of the 1910 convention your committee sent out the following questions:

1. State briefly to what extent industrial education is carried on in your city in—
   (a) Public schools—state courses taught.
   (b) Trade schools—state trades taught.
2. State how many, if any, of your employees are attending the above schools either during the day or at night.
3. Do you give your apprentices or other employees instruction? If so, state number, and, briefly, what taught.
4. Does your experience with boys or men who have had industrial education prove that it is valuable, or, if you have had no experience, do you favor extending the work of industrial education in your community, and on what plan?
5. We further desire to get some statistics on the cost of giving this instruction—
   1. In public schools, per pupil per year.
   2. In trade schools, per pupil per year.
   3. Shop instruction, per apprentice per year.

"These questions were sent out to the total membership of 856, of which 454 were represented in branch associations, leaving 402 individual firms, out of which 136 firms replied, giving specific answers to one or more of the questions. Replies were received from the secretaries of 11 branch associations. It was evident from the replies received that the majority of the firms had not given the questions proposed careful consideration, nor made any investigations of the conditions as to industrial education in their respective communities.

"It was the purpose of the committee in questions 2 and 3 to ascertain how many of the present employees of the National Metal Trades Association were receiving industrial education. The best summary that could be made from the insufficient data obtained shows an approximate number of less than 1600 receiving any kind of instruction. Undoubtedly there are more employees than this, because in the majority of instances these questions were answered with the statement 'none to our knowledge.' The majority reported are to be found in such districts or cities where the subject of industrial education has been studied and to a certain extent inaugurated in some definite form. The replies indicated that there was apathy in those communities where industrial education had not been advocated and introduced. In contrast to this, replies from such communities where industrial education had been studied and inaugurated showed the keenest interest in this subject and the greatest desire to see a further development."

As evidence of this Mr. Geier quoted a large number of replies, most of which favored the half-time and continuation system. The report continues:

HIGH OPINION OF INDUSTRIAL EDUCATION.

"Of all the replies received, only four were of the opinion that industrial education was of no value.

"For the purpose of making some definite recommendations to our membership, it was thought that it would be of value to our members to know something about the

relative cost of the various plans of industrial education. From the replies received it would appear that the cost per pupil in a well-equipped high school is about $50 per year. The cost per student in the Cincinnati Continuation School, which is a part of the public school system, is about $15 per year. There has been recently established a continuation school in the Rankin Trade School in St. Louis, the cost of instruction in which is about $15 per pupil per year. The cost in the trade school is necessarily very much higher, as indicated by the report from the Milwaukee Trade School, which gives the cost at $250 per pupil per year, and the Rankin Trade School, St. Louis, $185 per pupil per year.

"In question 4 sent out, the committee desired to get an expression from the membership as to what plan of industrial education they favored; 117 reported as in favor of industrial education without a specific recommendation as to plan; 27 specifically recommended either the co-operative or continuation plan. The committee is thoroughly in accord with all plans of industrial education, but it is quite evident from the figures above quoted that, because of its cost, industrial education on the plan of the co-operative or continuation school will be adopted for economic reasons largely.

EDUCATION MUST BEGIN EARLY.

"We must bear in mind that the satisfactory solution of the problem of industrial education involves the training of all the children who go into trades and an equally thorough training for all the trades into which they go; hence the probable development along lines which will utilize commercial shop equipments, requiring on the part of the school only the theoretical instruction.

"The development of the industries of Germany during the past decade or two has been amazing, and can no doubt be largely attributed to the fact that the efficiency of her workmen during that period has been greatly increased through the development of the system of industrial education from the lowest trade up through the university.

"The cost of living is steadily advancing, and higher wages must inevitably follow. To meet this increased cost of labor and also the keener foreign competition from Germany with her highly trained workmen, an increase in the efficiency of our workmen is imperative, and in our opinion can largely be accomplished by a thoroughly developed and far-reaching scheme of industrial education. The manufacturers must not shirk their responsibilities in furthering this movement, and, in fact, should ally themselves at once with every movement looking toward this end."

The suggestions were received with unanimous indorsement, sentiment being strong that industrial education along proper lines is the secret of renewing and maintaining the supply of skilled workers. A majority of the convention favor the half time and continuation schools, as compared with the older trade school idea.

Marshall Cushing, special representative at Washington, D. C., for this association and the National Founders' Association, made his report concerning Federal legislation during the year.

Labor Efficiency Betterment

Under the head of labor efficiency betterment John Calder, manager of the Remington Typewriter Works, Ilion, N. Y., presented a very interesting exposition of the subject, following in a general way his paper presented to the American Society of Mechanical Engineers and published in *The Iron Age* of February 16 last. Papers on the same topic were read by H. F. J. Porter, industrial engineer, New York, and W. A. Grieves, employment superintendent of the Jeffrey Mfg. Company, Columbus, Ohio. In the general discussion which followed the participants were: W. W. Coleman, vice-president Bucyrus Company, South Milwaukee, Wis.; H. N. Covell, Lidgerwood Mfg. Company, Brooklyn, N. Y.; William J. Manning, M.D., medical and sanitary officer, Government Printing Office, Washington, D. C.; F. C. Blanchard, works manager, Ashcroft Mfg. Company, Bridgeport, Conn.; A. N. Dutton, vice-president Peerless Motor Car Company, New York City; W. F. Helmond, Underwood Typewriter Company, Hartford, Conn.; Frank Burgess, Boston Gear Works, Boston, Mass.; M. W. Alexander, General Electric Company, West Lynn, Mass., and George Gilmour, chief engineer, engineering and inspection division of the Travelers Insurance Company, New York City.

Workmen's Compensation

Great interest centered on the report of the Committee on Employers' Liability Insurance, made by William Butterworth, the chairman, the chief points of which were published in *The Iron Age* of last week. The draft of a bill was presented, embodying the underlying principle that the employer should have the right to elect the method of determining compensation. In its preamble the bill lays down these principles, thus:

That any employer in this State may elect to provide and pay compensation for injuries sustained by an employee arising out of and in the course of employment, according to the provisions of this act, and thereby relieve himself from liability for the recovery of damages except as herein provided. If, however, any such employer shall elect not to provide and pay the compensation according to the provisions of this act, he shall not escape liability for injuries sustained by his employees arising out of and in the course of their employment by alleging or proving in any action brought against such employer:

1. That the employee either expressly or impliedly assumed the risk of the injury incurred; or

2. That the injury or death was caused in whole or in part by the negligence of a fellow servant.

Every such employer is presumed to have elected to provide and pay compensation as provided in this act unless and until notice in writing by the employer of his election to the contrary is filed with the State Bureau of Labor Statistics. Such employer, however, shall not be entitled to any of the privileges or advantages specified herein until a notice in writing of an election by said employer to provide such compensation has been filed with the State Bureau of Labor Statistics on blanks furnished by it for such purpose.

The participants in the discussion were Raynal C. Bolling, assistant general solicitor, United States Steel Corporation, New York City; Miles M. Dawson, expert in technical insurance, who was secured by Russell Sage Foundation to make a study of insurance in Europe, New York City; J. A. Macdonell, pioneer independent liability insurance expert, New York City, and H. V. Mercer, chairman Commission on Compensation for Industrial Accidents, Minneapolis.

Much interest attached to Mr. Bolling's remarks, extracts from which follow:

Raynal C. Bolling on Workmen's Compensation

"I think there is another party to the question besides the State, the employer and the employee; in fact, I think the party most interested is the consumer, the general public, because, while this may be temporarily a question between the employer and the employee, it is eventually a question of how much addition to the cost of the product the consumer can stand to meet the additional cost of making provision for workmen who are injured and the families of workmen who are killed in the production of these goods. Whenever we set about to right any wrong, particularly when we set about doing so as swiftly as this is being done, we run a risk of falling into other wrongs.

"I want to point out what seems to me a few of the very grave dangers that we run into in this kind of legislation. I think it is absolutely unfair that the employer should be compelled to accept the provisions of the compensation act when the employee is not bound to do so. If we are going to disregard this question of fault entirely, and it is not going to be a question of who is to blame, then it is not right that when the employee is at fault the workman should have the right to go to a jury and try to get an exorbitant verdict, but that when the workman himself is at fault he should be able to turn round and claim compensation under the compensation act. What is sauce for the goose ought to be sauce for the gander. There is no reason why the workman should ask to have his fault disregarded and be allowed to recover when he himself is directly to blame for his accident, and yet, if his employer is at fault, he expects to hold him for a heavy jury verdict.

CONTRIBUTION BY WORKMEN UNDESIRABLE.

"Representing perhaps the largest employer of labor in the country, I think that the idea of a contribution by the workmen is unsound and undesirable both in principle and in practice. If you examine these acts you will find that none of them attempts to give the injured workman the full measure of his loss. If a man is injured and loses three months' time, he does not get his full wages for that three months, he gets 50 per cent. of his wages. That means that he is losing 50 per cent. and the employer is contributing the other 50 per cent. So that I cannot see on principle why the workman should be asked to pay in something toward the employer's contribution of one-half of the loss. In practice I think it is worse still, because, if the workman contributes, you are compelled to put the fund in the hands of the State for administration.

"I do not think that anybody intends that the workman should contribute the money and that his employer should disburse it. That might be very desirable, but I don't think it is likely to be done. The discussion will start every time with the idea of a substantial contribution by the workmen just as it did in Ohio, where it started with the idea that the workman was to pay 25 per cent., in which case he might have some objection to an excessive expenditure from that fund; but as the matter advanced, they kept cutting that down until before the law was brought up for final passage—I do not know whether it has been acted upon by the higher legislature—but that contribution was finally cut to 10 per cent.; and when the workman's contribution is only 10 per cent., he will only be theoretically interested in keeping down any excessive expenditure from the fund. In fact, it would be no deterrent at all. Contribution by the workman involves State administration of the fund, and that again relates to a plan of State insurance such as has been proposed in Ohio and in Washington. Now please bear in mind when I speak of State insurance that I am not referring to insurance given by organizations of employers who then fix the premiums, and who themselves endeavor to keep down disbursements.

SAFEGUARDING AGAINST ACCIDENTS.

"I am talking about State insurance in such form as has been proposed, for instance, over here in Ohio. The first objection to that—and to my mind the worst objection to it—is that I think it is bound inevitably to effect what is much more important to my mind than the relief question—namely, the prevention of accidents.

"Five years ago the United States Steel Corporation thought its mills were well protected. All of its subsidiary companies had been at work on the question at that time for from 5 to 10 years. They do not carry insurance. They carried their own risk in their own casualty department, and they had done a great deal they thought to protect their workmen; but in the last five years, by reason of a central organization, and by a system of inspection outside of the insurance company, they have cut down serious accidents among the Steel Corporation's employees to 50 per cent. of what they were five years ago. That means that while to-day 2600 men may have been injured, there are 2600 men now alive and well who would have been reported as seriously injured or killed but for these improved conditions. They have become a leader in this thing. They have proved that the prevention of accidents is much more important than the relief of accidents.

"And now if you have a State actuary, as under the Ohio plan, fixing the premiums for all employers of the same class, the man who is in a rolling mill which is carefully protected may be placed at the same premium as the man employed at a rolling mill where nothing has been done at all to protect the workmen. The total expenditures of the Steel Corporation for safety work this last year has been $750,000; yet under this plan it would not be entitled to any more benefits than the people who have not paid a dollar for protection. If that will not discourage prevention of accidents, and the providing of safety devices I don't know what will. In the second place, the employer who has paid the premium and is relieved from the consequence of an accident, unless he is a mighty humane employer, will say: 'I have paid my premium and I am out of it,' and he won't worry about prevention. I think the financial burden would soon become intolerable, as the actuary would fix the premium, the employer having no voice in it. The State would disburse the money, and the employer have no voice in it, and I leave it to you from practical experience whether that would not afford as fine a political opportunity as ever existed under any State government, and whether the whole effect of such a system from one end to the other will not be simply to encourage the disbursements of as much money as possible? I think the strain on the administrative machinery of the State is going to be too great to be borne. I do not think any State administration has ever yet had the opportunity to disburse such enormous sums with such a small check upon the disbursements as will exist under such a system as that. A corrupt or partisan administration with such an opportunity as that is simply an appalling prospect; and even if it were not a corrupt administration but merely inefficient, perhaps the same results are likely to occur.

SHOULD BE COMPULSORY.

"I think that the most desirable provisions for this kind of legislation are that it should be compulsory in principle or in practice, so far as possible. I believe that the way out of it is the way suggested by your committee; and if the employers come in I think they will bring their workmen in very promptly. I think that a bill should include all employers where it is possible to obtain its passage, even to farm or domestic servants; and that where such a bill is passed, as it has been in New Jersey, it will tend tremendously to steady future legislation on the subject. You will find that the dangers are very much less decreased by not arraying all the employers on one side and the workmen on the other.

"I agree thoroughly with the provisions that ten days or two weeks must elapse before any payment shall begin. I believe the bill should contain, as far as possible, provisions similar to the New Jersey bill fixing a definite amount for a certain injury, because under that plan the great majority of injuries, even though they are not fixed in the schedule, will be settled between employer and employee. For instance, if the amount is definitely fixed as to its maximum that part will not have to be the subject of court arbitration or decision.

"And now I come to the last question—namely, what is to be done about it? That is the most important question. My first answer to that is, 'Don't chase rainbows,' because I think the little boy that chased the rainbow ran into a duck pond, and that is what I think we are in some danger of doing. There is a good deal of talk, particularly since the New York decision, of a Federal law along the line of some system like the German system. In the first place, I think it is unconstitutional. In the second place, consider the Federal laws that have been proposed on some other question, for instance, on the subject of divorce; I think it is pretty nearly impossible to obtain it.

"In the meantime, I am morally certain that if something is not done about this, and done pretty quickly, the defense of fellow servant and the assumption of risk doctrine will be taken away, and if that is done the employee won't want compensation and we cannot get it in any form; it will simply be a case of liability in every case, with a jury assessing damages. I think what you want to do is to get together and have proper bills passed in the State Legislatures, and, after that is done, I believe strongly that the employers can among themselves organize mutual insurance companies similar to the factory fire mutuals of New England, which deal with their situation there admirably and effectively. Such companies could enforce prevention just as effectually as the Steel Corporation has done among its subsidiary companies, and would thus strike at the very root of all this evil in a way that no State inspection or State prevention of accidents can ever hope to reach it."

The impressions of American mechanical engineers on foreign shop methods constituted the chief topic of the closing session. The papers were by H. L. Gantt, New York, and Oberlin Smith, president Ferracute Ma-

chine Company, Bridgeton, N. J., while Henry D. Sharpe, treasurer Brown & Sharpe Mfg. Company, Providence, R. I., and George Mesta, president Mesta Machine Company, Pittsburgh, discussed the subject in its various aspects.

Lewis Gustafson, superintendent of the David Ranken, Jr., School of Mechanical Trades, St. Louis, presented to the convention a paper on "The St. Louis Method of Technical Education."

The Resolutions

Several resolutions were presented by Henry D. Sharpe for the Resolution Committee. Besides Mr. Geier's resolution already mentioned, the following were adopted:

Whereas, The idea of systematic compensation for industrial accidents is rapidly gaining favor not only with the community at large, but with employers; and

Whereas, The various industrial interests may by co-operating and finding a common principle, contribute to an earlier and a better solution than will be attained if each interest shall devise plans with solé regard to its peculiar conditions,

Resolved, That the National Metal Trades Association heartily approves the idea of systematic compensation for industrial accidents;

Resolved, That it is not expedient for this association now to commit itself to a definite plan, and we indorse the opinion of our Committee on Employers' Liability Insurance, that "it is high time that all employers of labor were co-operating in a general effort to formulate some uniform policy";

Resolved, That we approve and applaud the splendid individual systems in force in the shops of individual members of this association, and urge, while eagerly awaiting the development of a common policy, the further establishment of voluntary plans of compensation;

Resolved, That the Committee on Systematic Compensation for Industrial Accidents be continued with enlarged membership, with a view to active co-operation with other organizations and the local branches of the association in the furtherance of practical legislation which will successfully bring about systematic compensation for injured workmen; and be it further

Resolved, That the Administrative Council is authorized to appropriate funds to a reasonable amount for the employment of counsel and to enable the committee to properly fulfill its duties.

Resolved, That the committee known as the Committee on Employers' Liability Insurance shall be known as the Committee on Systematic Compensation for Industrial Accidents.

Resolved, That this convention commends the American Society for the Prevention of Industrial Accidents to the members of the association and authorizes the Administrative Council to undertake membership in behalf of the association.

Whereas, The question of systematic compensation for industrial accidents is receiving wide attention in this country; and

Whereas, The matter of the prevention of such accidents is of the first importance and demands the greatest consideration by all employers; be it

Resolved, That this convention of the National Metal Trades Association recommends to its Administrative Council the consideration of a plan for the inspection of the shops of its members, which plan will furnish to the members themselves an opportunity of judging the comparative state of their own equipment and system for the preservation of human life, and will show to the association what progress (if any) may be made from time to time in the furnishing of adequate safety devices; and be it further

Resolved, That the Administrative Council be authorized to appropriate funds to a reasonable amount to make such inspection, if upon their investigation the plan appears feasible.

Whereas, The Congress of the United States has authorized the President to invite the International Congress of Social Insurance to hold its next triennial convention in the United States; and

Whereas, Such a gathering of persons who are interested in workmen's compensation and allied subjects and especially of the great experts of other countries, with its debates and discussions, freely participated in by all of our citizens who would attend, the same being followed by the publication of its proceedings, will inevitably be of the greatest service in supplying information to guide us in framing our laws; now, therefore, be it

Resolved, That the National Metal Trades Association respectfully petitions the President duly to extend this invitation and urges the authorities in charge of the International Congress to hold the proposed convention in the year 1912, if practicable; and

Resolved, That we petition the Congress of the United States to make suitable initial appropriations for the same.

Whereas, A demand having been made on certain members of this association by labor unions for an eight-hour working day; and

Whereas, It is our belief that the existing hours of labor in vogue by the members of this association are not excessive, viewed with reference either to the physical capacity of the workman or his social, moral and intellectual welfare; and

Whereas, The actually physical exertion required from the shop workmen has been in the last few years greatly reduced by the general introduction of labor-saving appliances in every department of the shops, and this condition is rapidly increasing; and

Whereas, The greater cost of manufacture due to shorter working hours and other restrictions of production is a direct and important, though often overlooked, factor in increasing the cost of living; and

Whereas, The movement of the labor unions for a shorter workday, restriction of output and higher wage is directly responsible for higher cost of production, and consequently higher cost of living; therefore be it

Resolved, That this association in convention assembled hereby record our absolute disapproval of any decrease in the hours now worked by the members of this association.

The New Officers

The officers were elected according to the recommendation of the Nominating Committee, as published in *The Iron Age* of March 27. They are: President, F. C. Caldwell, H. W. Caldwell & Son Company, Chicago, Ill.; first vice-president, Henry D. Sharpe, Brown & Sharpe Mfg. Company, Providence, R. I.; second vice-president, W. A. Layman, Wagner Electric Mfg. Company, St. Louis, Mo.; treasurer, Howard P. Eells, Bucyrus Company, South Milwaukee, Wis. Councillors for two years, J. H. Schwacke, Wm. Sellers & Co., Inc., Philadelphia, Pa.; C. Bermingham, Canadian Locomotive Company, Ltd., Kingston, Ont.; L. H. Kittredge, Peerless Motor Car Company, Cleveland, Ohio; W. H. Van Dervoort, Root & Van Dervoort Engineering Company, East Moline, Ill.; A. E. Newton, Prentice Bros. Company, Worcester, Mass.; P. O. Geier, Cincinnati Milling Machine Company, Cincinnati, Ohio. Councillor to serve unexpired term, Stevenson Taylor, Quintard Iron Works, New York City.

M. H. Barker, American Tool & Machine Company, Boston, was again elected an honorary member of the Executive Council.

At the alumni dinner J. H. Schwacke, the retiring president, was presented with a valuable watch as a token of appreciation of his efficient labors during his term of office.

The dinner at Hotel Astor, Wednesday evening, was largely attended and proved a very interesting occasion. The speakers were Walter George Smith, Philadelphia, president of the Conference of Commissioners of Uniform State Laws; Julius M. Mayer, former attorney general of the State of New York, and Rev. Dr. John Wesley Hill, New York.

The West Penn Steel Company's Extensions.—The West Penn Steel Company, Brackenridge, Pa., manufacturer of open hearth billets, sheet bars and steel sheets, has recently completed some extensive improvements and additions to its plant, consisting of annealing furnaces, resquaring shears, roller levelers, slitting machines, and also an extra large hydraulic stretcher leveler for leveling sheets up to 48 in. wide. Another pickling machine of the Mesta type, made by the Mesta Machine Company, Pittsburgh, has been added. With its present complete equipment the company expects to be able to dispose of nearly all its output from its seven hot sheet mills in high grade material for furniture, passenger cars and other fine work. It also makes large quantities of electrical steel sheets of very high quality, fully equal to imported material.

J. Holmes Whiteley, Stewart Building, Baltimore, Md., is the purchaser of the property of the Union Iron & Steel Company, at Big Stone Gap, Va., which was sold by the receiver April 6. Should the sale be confirmed by the court he expects to arrange to rebuild the blast furnace on modern lines and to equip it so as to be able to compete with any furnace of its size in the country. The item published in *The Iron Age* of last week intimating that Frank Samuel of Philadelphia would secure this property was evidently incorrect.

The McAuley Trap Company, Pittsburgh, has shipped 16 high-pressure steam traps to the Illinois Steel Company, Chicago. This was the eighth order received from the same customer in the past few years. Other recent shipments were to the Renova shops of the Pennsylvania Railroad, Eliza furnaces of the Jones & Laughlin Steel Company, Edgar Thomson plant of the Carnegie Steel Company and the Pittsburgh Piping & Equipment Company, Pittsburgh.

Molding Thin Castings on an Arcade Jarring Machine

The mold for an exceptionally thin casting was recently made at the foundry of the Chandler & Taylor Company, Indianapolis, Ind., on a three-cylinder jarring

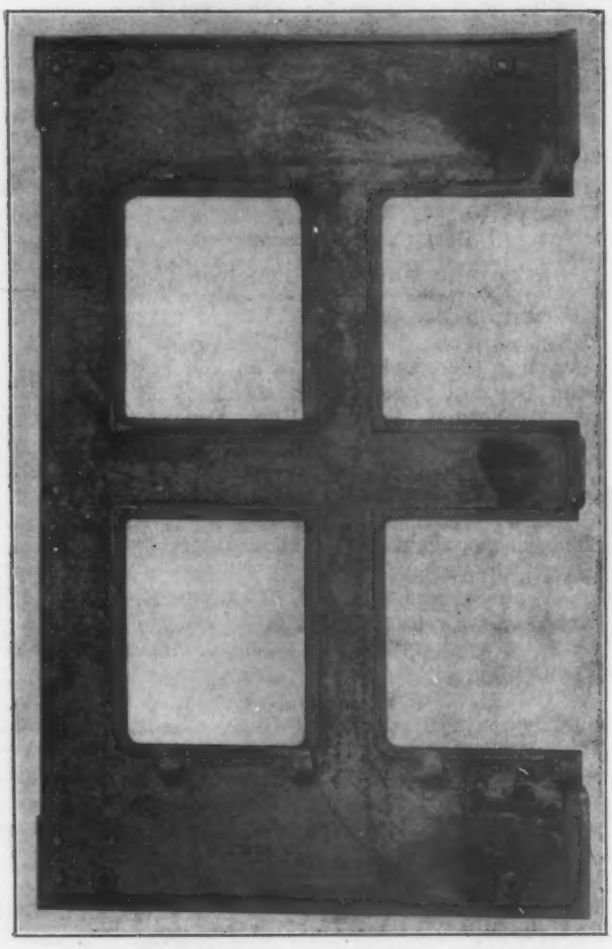


Fig. 1.—A Boiler Front Measuring 6 x 8 Ft. and ⅜ In. Thick, the Mold for Which Was Made on a Jarring Machine Built by the Arcade Mfg. Company, Freeport, Ill.

machine supplied by the Arcade Mfg. Company, Freeport, Ill. This casting, a view of which is given in Fig. 1, was a boiler front and the mold in which this casting was made is illustrated in Fig. 2.

While there is nothing special about the size of the casting which measures 6 x 8 ft., its thickness is remarkable as it is only ⅜ in. Making these molds with the aid of a jarring machine has resulted in at least doubling the output of the foundry. Prior to the installation of this machine only one of these castings could be made per day. At the present time it is possible for one man to make three of these in a day, a result which is partly attributable to the use of molding machines and also to the fact that the cope and the drag are made separately, the former not being put on the mold until the drag is completed.

The Iron and Steel Institute

The annual meeting of the Iron and Steel Institute will be held at the Institution of Civil Engineers, Great George street, Westminster, London, May 11 and 12, commencing each day at 10.30 o'clock a.m. The following is a list of the papers that are expected to be submitted:

"Temperature Influences on Carbon and Iron," by E. Adamson, Sheffield.

"The Chemical and Mechanical Relations of Iron, Chromium and Carbon," by J. O. Arnold, Sheffield, and A. A. Read, Cardiff.

"The Growth of Cast Irons After Repeated Heatings," by H. C. H. Carpenter, Manchester.

"The Relation of Impurities to the Corrosion of Iron," by John W. Cobb, Leeds.

"Magnetic Properties of Some Nickel Steels, with Some Notes on the Structures of Meteoric Iron," by E. Colver Glauert, Berlin-Charlottenburg, and S. Hilpert, Berlin-Grunewald.

"Note on a Process for the Desiccation of Air by Calcium Chloride," by Félix A. Daubinè and Eugène V. Roy, Auboué, Meurthe-et-Moselle.

"The Volumetric Estimation of Sulphur in Iron and Steel," by T. Gifford Elliott, Sheffield.

"The Action of Aqueous Solutions of Single and Mixed Electrolytes on Iron," by J. Newton Friend and Joseph H. Brown, Darlington.

"Iron-Silicon-Carbon Alloys," by W. Gontermann, Siegen, Westphalia.

"The Influence of Vanadium Upon Cast Iron," by W. H. Hatfield, Sheffield.

"The Organic Origin of the Sedimentary Ores of Iron," by W. H. Herdsman, Glasgow.

"Some Studies on Welds," by E. F. Law, W. H. Merrett and W. Pollard Digby, London.

"The Corrosion of Steel," by Percy Longmuir, Sheffield.

"The Influence of 2 Per Cent. Vanadium on Steels of Varying Carbon Content," by A. McWilliam and E. J. Barnes, Sheffield.

"Some Properties of Heat-Treated 3 Per Cent. Nickel Steels," by A. McWilliam and E. J. Barnes, Sheffield.

"Mechanicalizing Analysis as an Aid to Accuracy and Speed for Commercial Purposes," by C. H. Ridsdale and N. D. Ridsdale, Middlesbrough.

"Welding Up of Blowholes and Cavities in Steel Ingots," by J. E. Stead, Middlesbrough.

The autumn meeting this year will, by the kind invitation of the Associazione fra gli Industriali Metallurgici Italiani, be held at Turin, Italy, and an influential Local Reception Committee has been formed, under the presidency of G. E. Falck, president of that association, to carry out the necessary arrangements. The meeting will commence October 2, and with the subsequent tour organized in connection therewith will occupy about 15 days from the time of leaving London until the return. This tour includes Savona, Genoa, Pisa, Rome, Naples, Florence and Milan.

Fig. 2.—The Mold from Which the Casting Was Made.

The Pelican Metal & Roofing Company, 333 Howard avenue, New Orleans, La., has purchased a square of ground and will erect at once a one-story factory building, 100 ft. square, to take care of its increasing business.

The Patterson Adjustable Electric Light Bracket

A new type of electric light bracket which can be adjusted for use on all classes of machines has been placed on the market by the Patterson Tool & Supply Company, Dayton, Ohio. The special advantages claimed for this bracket are that it can be operated at any point, a saving of 75 per cent. in the number of globes broken is

Fig. 1.—The Bench Type of Adjustable Electric Light Bracket Made by the Patterson Tool & Supply Company, Dayton, Ohio.

effected by its use and an increase in the output of the machines due to better light is secured. Fig. 1 shows the bench type of bracket, and Fig. 2 illustrates the machine type. These brackets are furnished with various base connections which enable them to be used in practically all locations in every branch of manufacturing.

The bench bracket shown in Fig. 1 is set forward, and the light is thrown on the work, so that the operator can

Fig. 2.—The Machine Bracket Attached to a Lathe.

see at all times the line to which he is working. If desired this bracket can be reversed so as to throw the light through the opening in the work. A universal machine bracket is illustrated in Fig. 2 attached to a lathe carriage. In this position the light is cast directly on the point of the tool, and the operator is enabled to see the tool when doing internal work just as well as if it was external work.

The construction of these brackets is strong. The brackets are made of sheet steel, and the joints operate on leather frictions between two disks and a strong rivet. The general design is such as to enable them to withstand the general hard usage met with in a factory. The base of the bench bracket is of heavy cast iron, while that of the machine bracket has a hole to take a ½-in. bolt, thus making it convenient for attachment to a machine having T-slots for bolts. For locating them permanently four screw holes are also furnished. A screw clamp or a spring clip is used to hold the lamp in place.

The hight of the bench bracket is 23 in., and when a right angle bend is made at the first joint there is a 16-in. reach from the center of the stand to the light. At the second joint the machine bracket has a reach of 21 in. from the center of the base to the light and will cover a radius of 42 in.

The Rogers-Brown Iron Company

The report of the Rogers-Brown Iron Company, Buffalo, N. Y., for the fiscal year ending December 31, 1910, shows gross earnings of $3,768,220. Deducting operating expenses, taxes, &c., amounting to $3,138,658, leaves net profit of $629,562. After paying bond interest, $207,083, the amount for surplus is $422,479. The balance sheet, December 31, 1910, is as follows:

Assets.	
Property and plant	$12,142,536
Investments in subsidiary companies	1,588,770
Stocks of ore, coke, pig iron and material	976,232
Accounts receivable	496,441
Cash	306,946
Accounts paid in advance	23,434
Discount on debenture bonds	56,667
Total	$15,591,026
Liabilities.	
Capital stock	$5,000,000
Buffalo & Susquehanna Iron Company first mort. 5s.	2,600,000
Buffalo & Susquehanna Iron Company 5 per ct. debs.	1,500,000
First and refunding mortgage 5s	3,415,500
Notes and accounts payable	1,233,347
Dividends payable January 1, 1911	50,000
Accrued bond interest	127,546
Liabilities accrued, not due	55,931
Reserve for depreciation of property	99,586
Surplus	1,509,116
Total	$15,591,026

The Sullivan Machinery Company, manufacturer of mining and quarrying machinery, 150 Michigan avenue, Chicago, has established an office at 814 Salisbury House, London Wall, London, E. C., England, which will, in future, have general charge of its business in England and on the continent of Europe. Howard T. Walsh, for several years the company's Pacific Coast manager at San Francisco, is in charge of the new London office, and he has associated with him Arthur F. Belding, who has been connected with the Joplin office for some time.

The Vanadium-Alloys Steel Company, Latrobe, Pa., which is about to increase its capital stock from $200,000 to $300,000, states that the increase is for the purpose of taking care of its growing business, the company expecting a very prosperous year. No extensions to its plant are contemplated at this time. The company manufactures high speed, alloy and carbon steels.

It is of great interest to note the excellent work of the two furnaces of the Northwestern Iron Company, at Mayville, Wis., one running on high phosphorus and the other on malleable Bessemer pig iron. The output for the second week of April was 3913 tons, or 559 tons per day. Previous to March, 1909, the best week's output was 2737 tons, or 391 tons per day.

The Deutsch-Amerikanischen Techniker-Verbandes (National Association of German-American Technologists), of which H. Bacharach, 721 Lewis Block, Pittsburgh, Pa., is secretary, has issued a pamphlet containing the constitution and by-laws of the organization and a full list of the members with their addresses.

The Algoma Steel Company's Coke Plant

Steps in an Unusual Record of Construction—Two Batteries of 55 Koppers Ovens Each, with By-Product Works, Built in Less Than a Year

BY D. M. GRIFFITH.

(*With Supplement*)

On March 11, 1911, the first coke was made in No. 1 battery of the 110 by-product coke ovens which were constructed by H. Koppers of Joliet, Ill., for the Algoma Steel Company, at Sault Ste. Marie, Ont. Less than a year elapsed from the time excavation was started until the ovens were producing coke; and considering the extreme conditions under which this plant was built, such as severe weather, marshy ground, poor labor conditions, isolation of plant from base of supplies and working from temporary yard level, remarkable progress was made in its construction.

On account of the marshy ground at the site chosen for the coke plant, it was necessary to support all of the foundations upon piling. The total number of piles required was 6020. To divert the course of a creek which wound around through the coke plant site, two concrete retaining walls were built. One of these was made of sufficient size to support the track for the shear leg of the traveling coal bridge. This creek as shown in the plan view on the accompanying supplement, now extends the entire length of the coke plant and empties into the slip just beyond the stack end of battery No. 1.

The slip was extended about a half mile, so that coal could be delivered direct to the coke plant by boat. This

Fig. 1.—Part of the Piling Used for Carrying the Concrete Slab. Photograph Taken April 5, or 15 Working Days After Excavation Was Started.

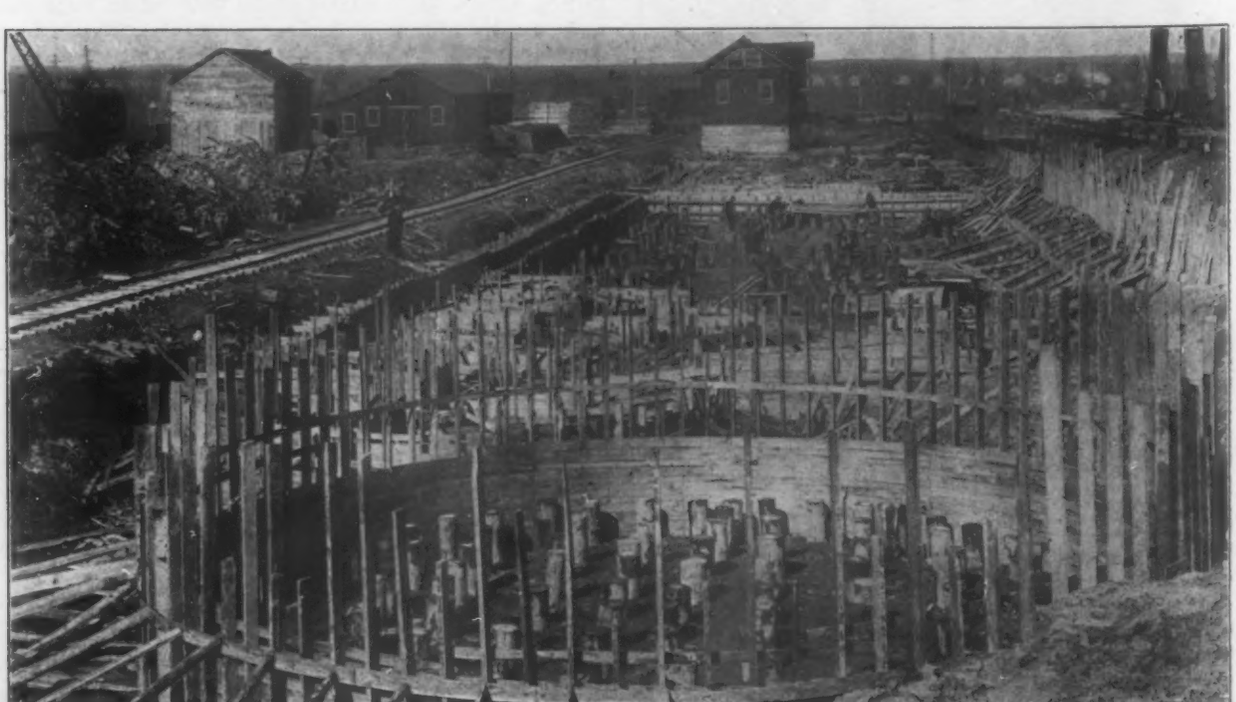
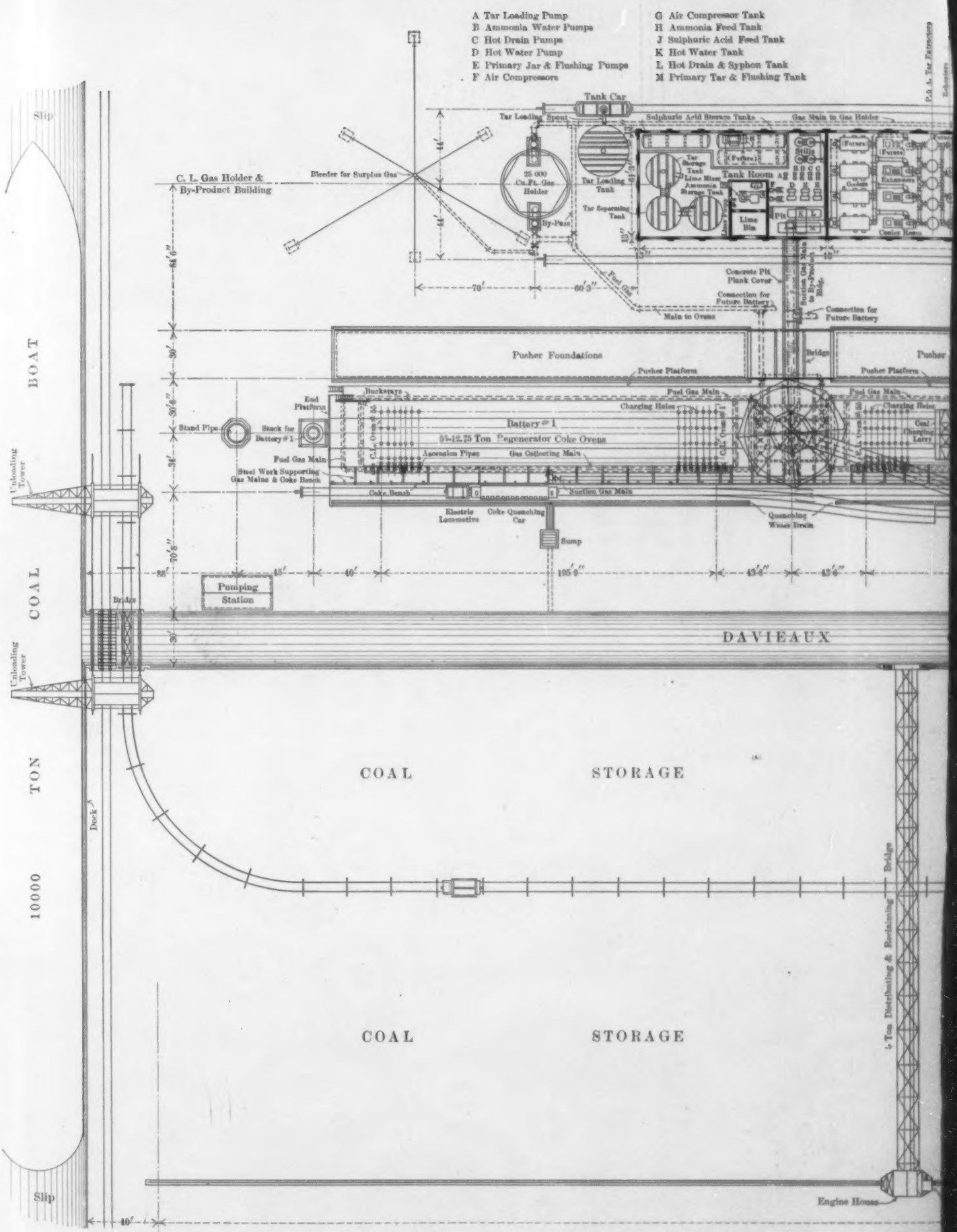


Fig. 2.—Progress in Piling and Form Work in 19 Working Days, or Up to May 19.



GENERAL ARRANGEMENT OF KOPPERS BY-PR

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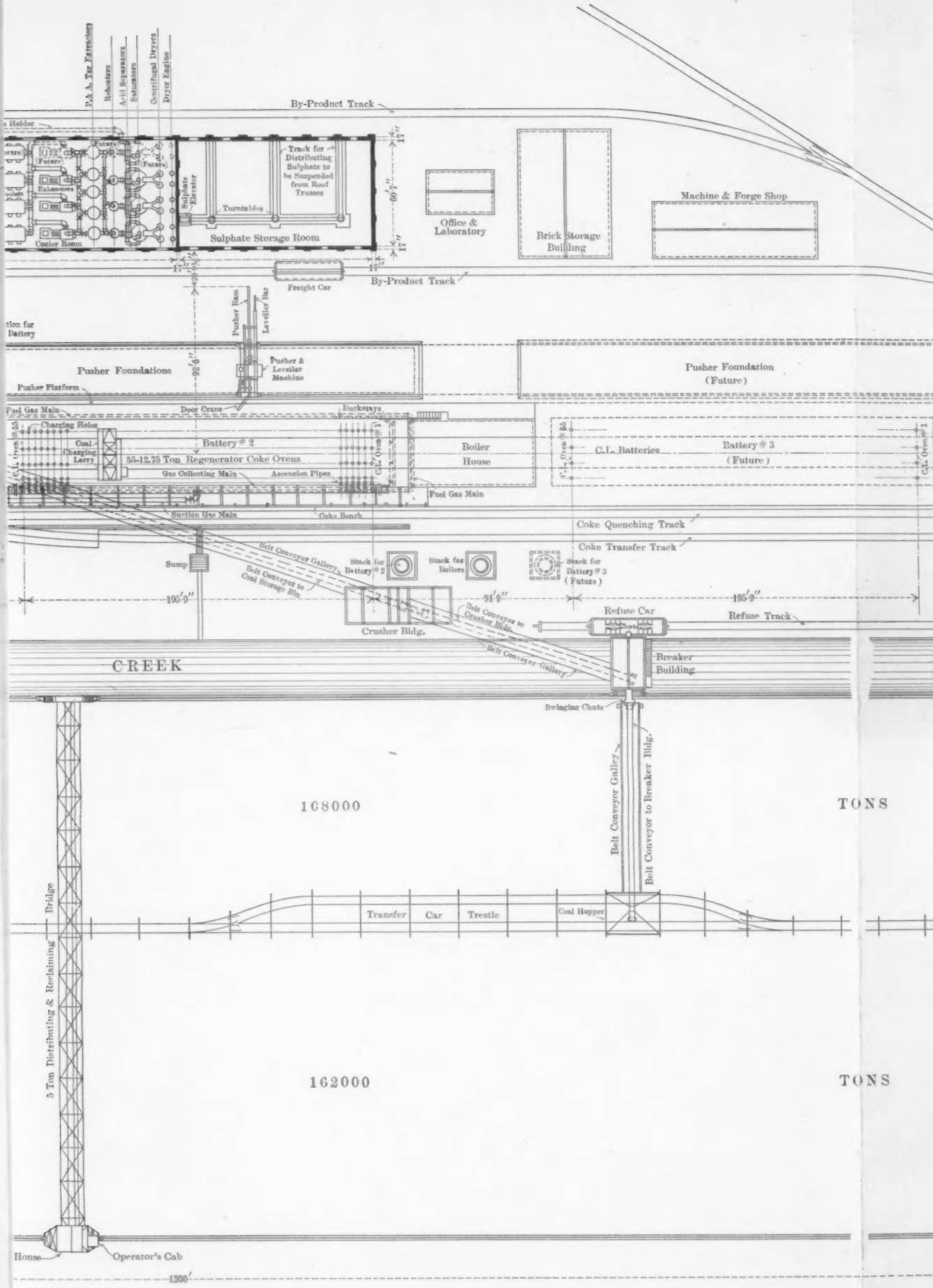
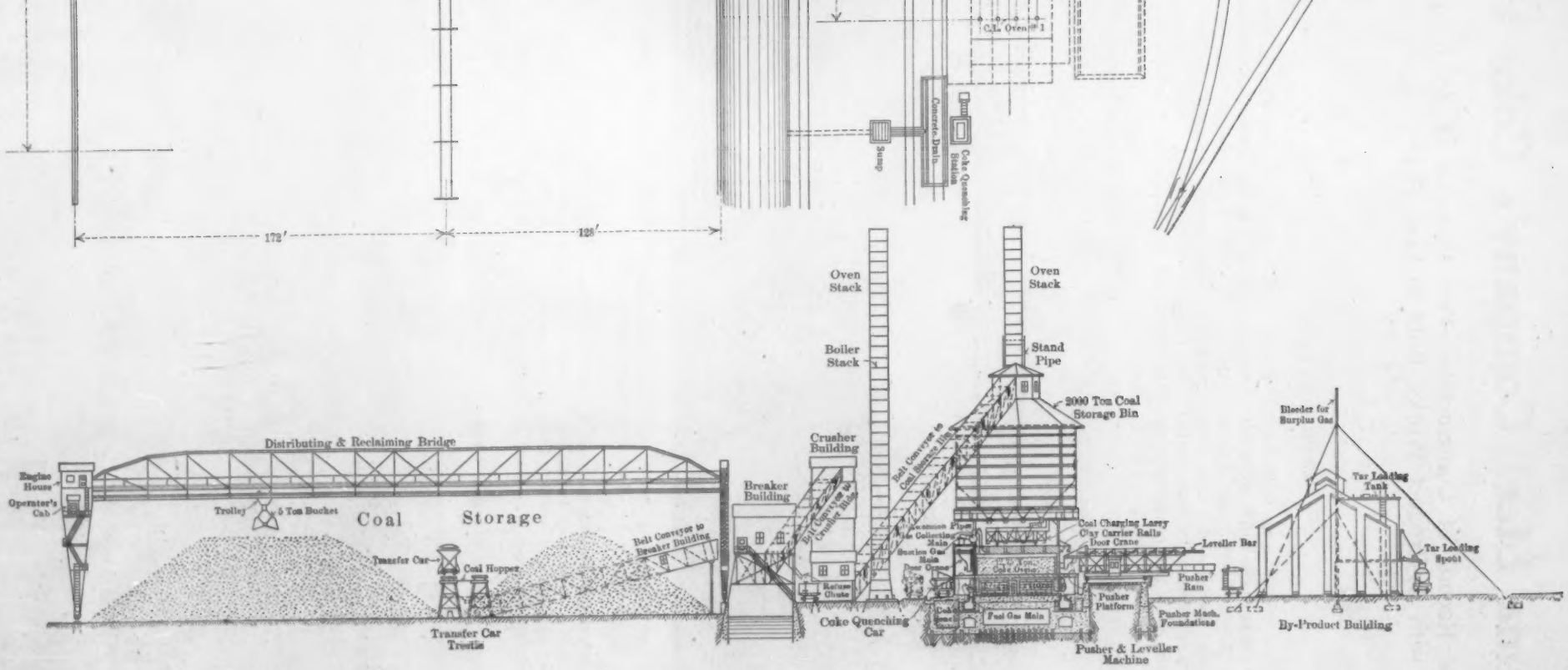


BY-PRODUCT COKE OVENS AT THE PLANT OF THE ALGOMA STEE

SAULT STE. MARIE, ONTARIO.



STEEL COMPANY,

Fig. 3.—Oven Foundations and Chimney Flues to Stack, with Brick Work on Regenerator Walls Under Way.

channel is 90 ft. wide and is of sufficient depth to take care of boats with a carrying capacity of 12,000 tons of coal.

Coal Unloading and Storage

In connection with this slip and extending its entire length a very substantial timber dock has been constructed. This supports the track on which the coal unloaders travel, also a coal transfer trestle by means of which the coal from the boat unloaders is conveyed in by electrically operated coal transfer cars to either the coal storage pile or to the coal hoppers.

The coal is taken from this hopper by a belt, to the coal breaker and crusher building, where it is broken up and the iron particles removed by a magnetic separator. The coal is then crushed and conveyed by a belt to mixing bins, from which point it is conveyed by another belt to the 2000 ton coal storage bin. By means of hand operated gates, which are located in the bottom of the coal storage bin, the coal charging car receives the coal from the bin for charging direct into the top of the ovens.

In Fig. 1 is seen a part of the piling which is used for carrying the concrete slab, upon which the oven and stack foundations are supported. These piles vary in length from 30 ft. to 60 ft. and are spaced about 2 ft. 9 in., center to center. The steel traveling bridge shown in this view was used for distributing the concrete for the oven and by-product building foundations and the creek retaining walls. The photograph was taken on April 5, 1910, just 15 working days after the excavation work was started.

Fig. 4.—Showing the Large Amount of Concrete and Form Work Completed in 37 Working Days Following the View in Fig. 2.

Progress in Foundation and Brick Work

In 27 working days the form work for the voids and chimney flues was completed and the 3 ft. thick concrete slab, which rests on the piles, was laid. At the same time the concrete foundations for the entire first battery were up to an elevation of 11 ft. above the top of the piles. This left a hight of about 5 ft. more of concrete to be put in, to bring the oven foundations up to the proper level for the starting of the brickwork.

Fig. 5.—Showing by the Hight of the Locomotive the Large Amount of Form Work Needed to Give a Yard Level 16 Ft. Above Top of Piles.

Fig. 6.—Progress Made Up to October 6, 1910.

On April 26 excavation work was begun for the by-product building and gas holder. In Fig. 2 can be seen the progress made in piling and form work up to May 19. In 19 working days all of the excavating and piling for the foundations for the by-product apparatus, building walls and gas holder was finished, as well as considerable form work for gas holder and building walls.

Fig. 3 shows the progress made in the construction work on the ovens up to June 8. The oven foundations were then finished and the chimney flues to the stack constructed and lined with brick. A good start had also been made on the brickwork of the regenerator walls. In the background can be seen the progress made on the slip up to this date. The channel had been dredged for a distance of about one-third of a mile and had reached a point a little beyond the center line of the ovens.

Fig. 4 calls attention to the status of the by-product building form work and foundations on July 2. It shows that a large amount of concrete and form work was completed in the interval of 37 working days between the taking of the views in Figs. 2 and 4.

Fig. 5 gives an idea of the amount of construction work that had been done on the ovens and by-product building up to August 13. The regenerator walls had been finished, the oven wall brickwork had reached a hight of about 4 ft. above the floor of the ovens, and the concrete pinions and end buckstays had been erected at each end of the battery. In comparing the hight of the form work of the by-product building with that of the

standard locomotive shown in the foreground, it is evident that a large amount of construction work was necessary at this point to bring the foundations to their proper elevation, so that the finished yard level would be 16 ft. above the tops of the piles.

Fig 6 indicates the progress made up to October 6, 1910. The brickwork has been completed for battery No. 1. In the foreground is shown a part of the form work and concrete for battery No. 2. The steel roof trusses and columns for the by-product building are erected and work has been started on the purlins and building walls.

By November 16, 1910, the buckstays, coke and pusher side steel benches, with cast iron cover plates, steel stack and supports for gas collecting and suction mains had been erected. The regenerators had been filled with checker brick, the regenerator end walls bricked in, and the brick walls underneath the benches completed.

Fig. 7 shows the slip, coal unloaders, coal transfer trestle, dock, traveling coal bridge, standpipe, pump house, stack for battery No. 1, coal storage bin, by-product building, battery No. 1 and gas holder. This view was taken December 7, 1910. On battery No. 2 up to December 15, 1910, the foundations for the coke pusher and leveling machine had been finished and the oven brickwork for the entire battery had reached a hight of 8 ft. above the floor of the regenerators. A large temporary building, which was used to protect the brickwork and workmen during the severe cold weather, was practically completed.

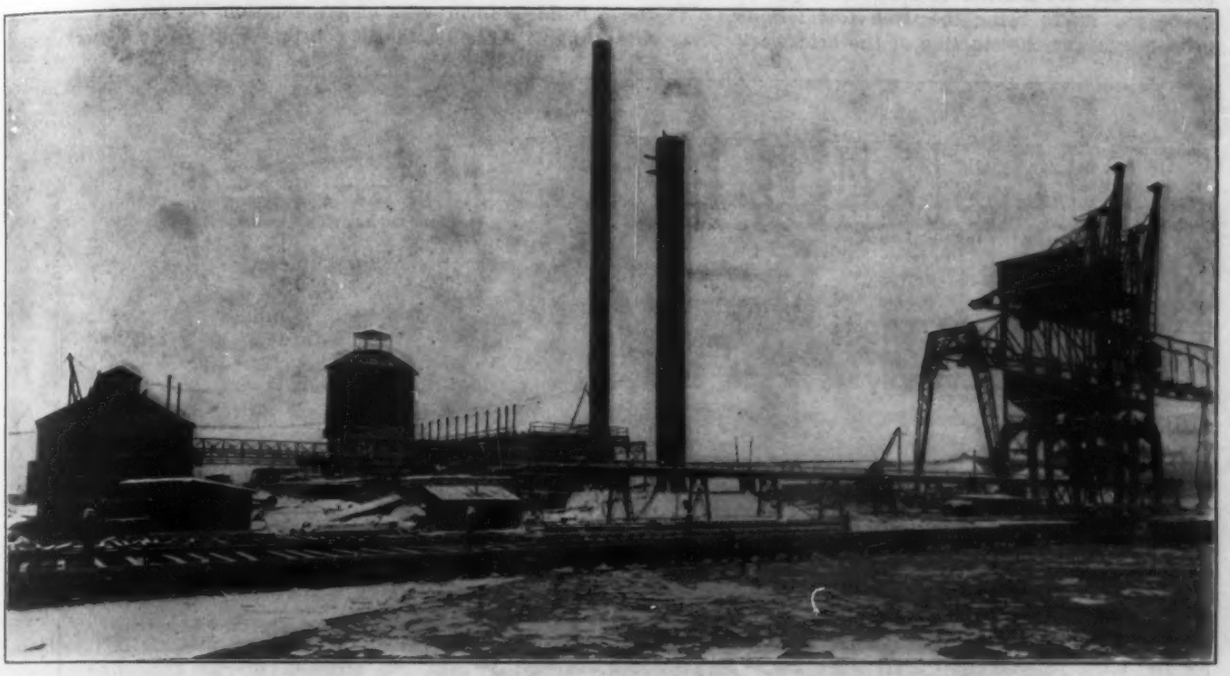


Fig. 7.—View Taken December 7, 1910, Showing Slip, Coal Unloaders, Coal Transfer Trestle and Storage Bin, By-Product Building and Battery No. 1, with Stack and Gas Holder.

Fig. 8 is an interior view of the temporary building over battery No. 2. The brickwork here shown is above the roof of the ovens and nearly completes the brickwork for this battery.

Fig. 8.—Temporary Building Over Battery No. 2. Brickwork for This Battery Nearly Completed.

In Fig. 9 the electrically operated four-hopper steel coal charging larry is shown on top of battery No. 1. This car receives its coal from the coal storage bin and has a capacity of 12.75 tons, which is sufficient to charge one oven. In the background can be seen the 2000-ton steel coal storage bin which is located between battery No. 1

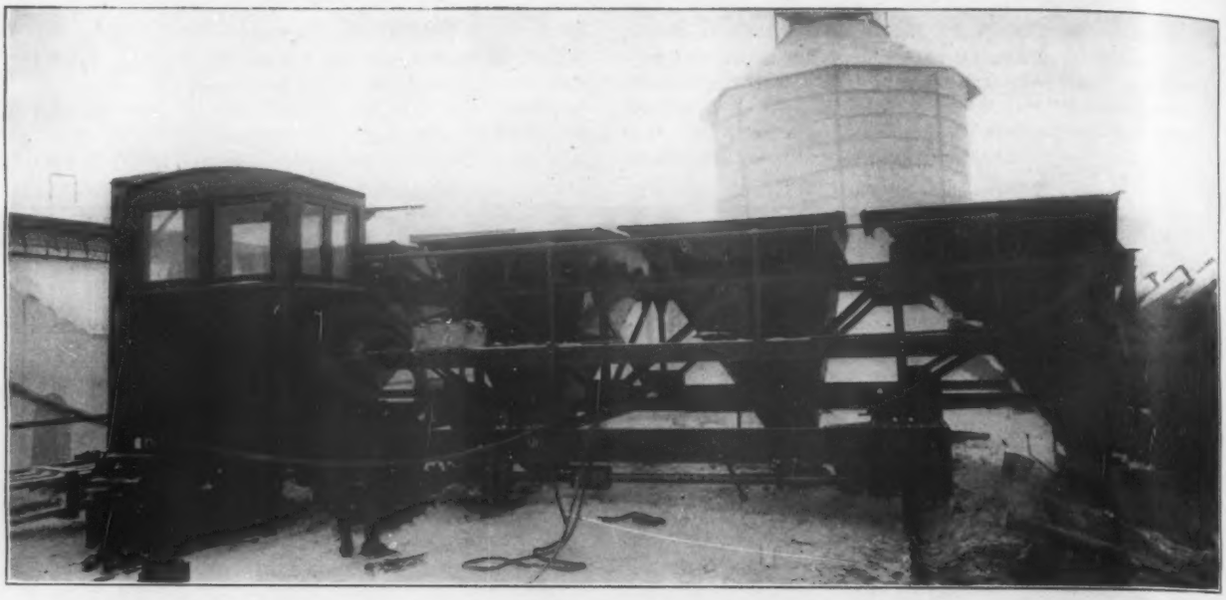


Fig. 9.—Electrically Operated Four-Hopper Coal Charging Larry.

and battery No. 2. This view was taken January 10, 1911.

Fig. 10, for which the photograph was taken from the pusher side on March 1, 1911, gives a measure of the progress made on battery No. 2. The brickwork, including the regenerator end walls and the checker brick, had been finished and the buckstays and structural work on coke and pusher benches had been erected.

In the accompanying supplement, which gives the general arrangement of the entire coke plant, the present installation of two batteries of 55 ovens each is shown, and the provision made for a future installation of one battery of 55 ovens. Battery No. 2 will be ready to make coke by April 24.

The Fawcus Machine Company, Pittsburgh, has shipped a set of worm wheels and worm shaft for a vertical windlass to be installed on the United States battleship Wyoming. The shaft is 12 ft. long, 6 in. in diameter, with two worms, right and left thread. The wheels are made of manganese bronze, and have a pitched diameter of 74 in., with 8-in. face.

The Pittsburgh office of the Babcock & Wilcox Company, Farmers' Bank Building, has received an order from the Crucible Steel Company of America for 5000-hp. Stirling water tube boilers, which will be installed in its new plant at Midland, Pa.

The Hooper-Falkenau Engineering Company

The Hooper-Falkenau Engineering Company, 165 Broadway, New York, has been formed to take over the business of George K. Hooper, the well-known designer and organizer of industrial plants. Mr. Hooper's experience covers a period of 25 years, ranging in importance from that of an unskilled laborer to executive and consulting engineer. The design of new machinery for special purposes and the management of plants are among his activities. One of the most notable connections in the latter capacity has been the management of the Weir Frog Company, Cincinnati, Ohio, with which he has been connected for five years and at present is serving as vice-president and general manager. Perhaps most notable of Mr. Hooper's work has been in improving and systematizing foundry practice.

Arthur Falkenau, in joining forces with Mr. Hooper, withdraws from the Falkenau-Sinclair Machine Company, Philadelphia, of which he has been president for a number of years. In the course of 30 years' experience as a consulting engineer and owner of machine works, Mr. Falkenau has designed and perfected many successful devices, among which probably the best known is the pneumatic system for handling mail. Another well-known invention is a mine exploration suit, the first successful application of the helmet idea to mine rescue work.

Fig. 10.—Progress on Battery No. 2 Up to March 1, 1911.

A New Metal Studding Machine

A machine for manufacturing metal studding of a peculiar shape is built by the Wire Specialty Works, 549 Fulton street, Chicago, Ill. Fig. 1 is a view of the machine, and Fig. 2 shows a sample of the studding made by it.

The plain sheets of No. 21 gauge steel used for making the studding are first perforated on a power press.

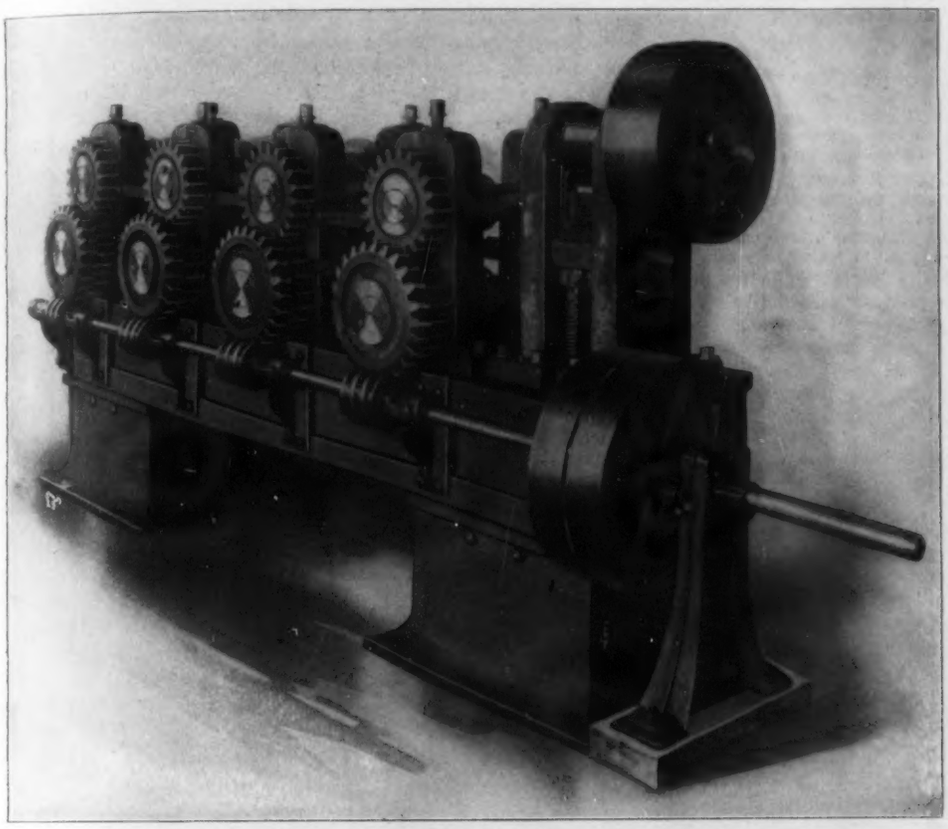


Fig. 1.—A New Machine for Making Metal Studding Built by the Wire Specialty Works, Chicago, Ill.

They are then fed from a table into the first of the four forming rolls in the machine. These bend the metal to approximate shape, and after it leaves the last of them it is fed through a swaging device which hammers the studding into the exact form and makes it perfectly straight. The machine is entirely automatic, and it is only necessary for the operator to start the sheets into the first set of rolls.

The studding shown in Fig. 2 is of a double type for making hollow partitions, in which two courses of plaster board are inserted, leaving an air space between. Its shape is secured by employing a set of guides between the

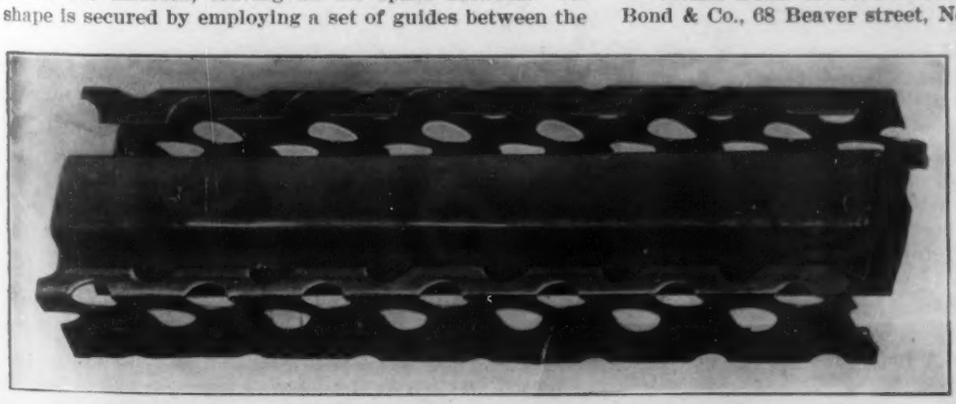


Fig. 2.—A Sample Piece of Studding Made by the Machine.

four rolls for folding the metal. If desired, studding with only one channel can be formed on the machine. This type is used where an air space is not required between the two sides of the partition.

This machine has a capacity of 25,000 ft. of studding per day, and the metal sheets pass through the rolls at a speed of 50 ft. per minute. The machine weighs 10,000 lb., and occupies a floor space of 3 ft. 6 in. by 9 ft.

Repairing Concrete Floors

There is a popular and widespread fallacy to the effect that a concrete floor once chipped or cracked is practically at the end of its usefulness. This is undoubtedly due to the unsatisfactory results of unskilled workmen attempting to repair a damaged floor. Unless proper care is taken, and the workman engaged on the job has sufficient knowledge of concrete, a repair job is most unsatisfactory.

In this connection, the practice of the Aberthaw Construction Company, Boston, Mass., is worth noting. In certain of the concrete buildings erected by this company floors have been chipped in particular places because of some phase of the industry which gave rise to dropping heavy materials in one place, as, for example, the winding rolls in a paper mill. When a floor has thus become damaged the proper method of repairing is to chip out with mallet and chisel a recess, usually square, of sufficient depth to reach to the bottom of the deepest break in the concrete surface. The rough surface resulting from this process is then treated with acid to bring out the solid aggregate, or else a stiff brush is used to remove all the loose dust, and the recess washed out by sluicing out with a hose. When all the dust particles have been removed, the recess is grouted with cement, and before this has set the granolithic finish applied and leveled up with the rest of the floor. Repairs made in this manner are as permanent as the remainder of the floor, as the bond between the new and old concrete will be perfect if all the loose material has been carefully removed.

Vivian Bond & Co.'s Pittsburgh Business.—Vivian Bond & Co., 68 Beaver street, New York, who transact a large business in ferroalloys, have not retired from the Pittsburgh field as erroneously stated in last week's issue of *The Iron Age*. It is true that they have closed their Pittsburgh office, but this is simply because it has been found that as much business can be transacted over the long distance telephone, and by having a representative cover the field at frequent intervals as could be done by having an office in Pittsburgh. The firm first opened its office in Pittsburgh in the fall of 1908, but it did a considerable business there before that time. The representative of the firm will as actively cover the Pittsburgh territory as when an office was retained there. It is regrettable that the notice of the closing of the Pittsburgh office should have been made so sweeping.

The National Association of Manufacturers

The sixteenth annual convention of the National Association of Manufacturers, of which John Kirby, Jr., is president, will be held at the Waldorf-Astoria Hotel, New York, May 15, 16 and 17. Advance notices of this convention indicate that it will be the most important held in the history of the association. In issuing the call for the convention President Kirby urges upon members the advisability—in fact the necessity—of their personal attendance. He adds:

There has never been a period when the country's industrial interests have been confronted with so many vital problems as in the present year of 1911. It may also be added that never before has organization been so urgently needed and discussion so important to the welfare of the nation's industries. The sixteenth annual convention, therefore, comes at a time when every manufacturer finds himself face to face with conditions strongly affecting the future safe-conduct of his business. The problems which will claim the attention of the coming meeting are many and vital, including labor in its various ramifications, also the great constructive policy interwoven in the prevention of accidents and the equitable solution of the urgent question of industrial relief.

Results of the investigations made in Europe by the association's special commissioners, F. C. Schwedtman and James A. Emery, covering the very timely and important subjects of accident prevention and industrial relief, will be presented in the form of a voluminous report to the convention. In all probability one entire day and evening will be devoted to these subjects. An important feature connected with accident prevention and industrial insurance will be the displaying of a great number of lantern slides, illustrating not only the experiences of Germany but also conditions in the United States. The fact that fully 1,000,000 persons are injured yearly in the industries, and that under our present laws it required an expenditure of more than $17,000,000 to administer $9,000,000 for the benefit of injured employees in 1909, indicates the vital importance of the subject to labor, capital and the general public alike.

A special feature will also be made of banking and currency, and the attitude of our manufacturers toward the plans recently proposed to reform our inadequate banking and currency systems will be discussed. Other questions of economic importance, such as immigration, industrial education, a reform of our patent laws and the creation of an independent Tariff Commission of experts will also be considered.

The sessions will be open to the general public, and the association extends a cordial invitation to all manufacturers to attend, whether members of the association or not.

The Thomas Carlin's Sons Company, works at 1600 River avenue, N. S., Pittsburgh, has moved its office from room 1919 to room 1947 Oliver Building, Pittsburgh. The company recently shipped to Henry A. Hitner's Sons, Philadelphia, a No. 1 belted shear to cut 6 in. square, and has received an order from the Prudential Iron & Steel Company, Coburg, Ontario, Canada, for a No. 7 motor driven shear to cut material 3 in. square.

A New Standard Motor Driven Rolling Mill

Designed for Rolling Sections and Special Shapes and Sheet Metals, and Possessing Various New Features

A new type of motor driven rolling mill has been brought out by the Standard Machinery Company, 7 Beverly street, Providence, R. I., and is a continuation of the standard line which at the present time comprises 16 sizes, all following the one general type. This new machine is designed for use with specially formed rolls for rolling extra large sections of copper moldings, automobile rims and other special shapes and for rolling sheet steel, copper, zinc, German silver, nickel, platinum, gold plate and gold, its function with the precious metals being to break down ingots and reduce them to a thickness of about ⅛ in. for transfer to the finishing or mirror lapped rolls. Fig. 1 shows the front of the mill with the back gears, the wabblers and the rolls, while Fig. 2 is a view taken from the gear end of the machine, and Fig. 3 illustrates the same type of mill equipped with a friction clutch and also shows the herringbone pinions.

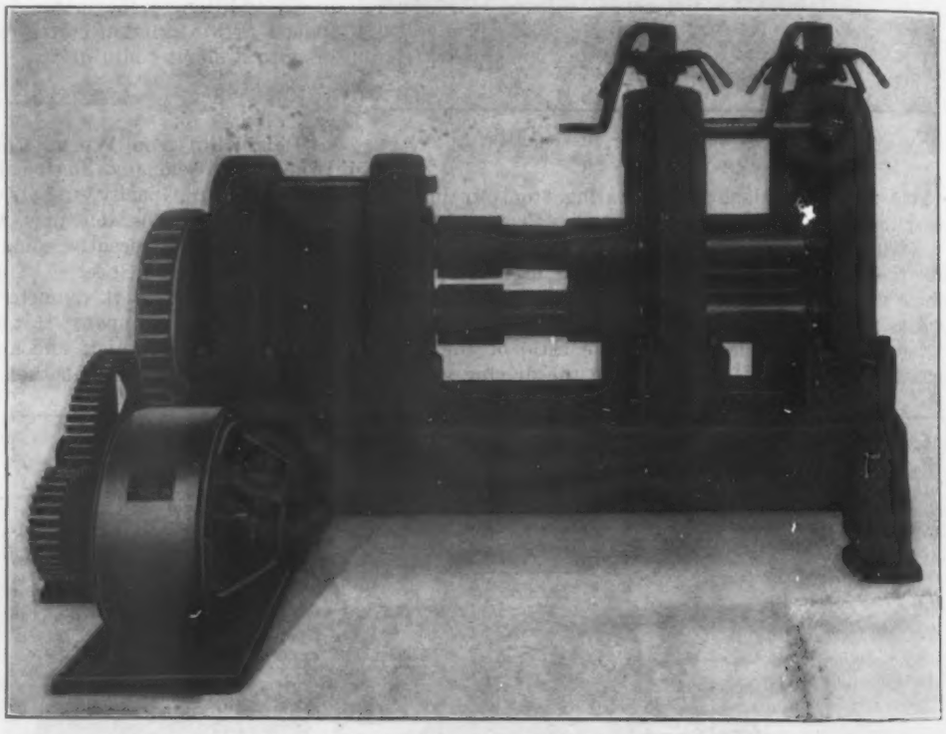


Fig. 1.—The New Motor Driven Rolling Mill Built by the Standard Mfg. Company, P

The photographs show the machine with the regular square section roll housings, fitted with rolls 12 in. in diameter and 20 in. wide, having heavy phosphor bronze bearings on the roll journals with crucible steel adjusting screws. The upper boxes are supported by side yokes, which straddle the adjusting screws and are connected to the boxes by straight rods for lifting purposes. At the top of each upper box is a hardened and ground steel thrust washer, which takes the thrust of the screw. The outboard or roll housing is fastened with T bolts and T slots in the bed, permitting the use of rolls of different lengths, as the housing slides in and out. The maximum length roll that can be used is 22 in., and the minimum length is 10 in., both being 12 in. in diameter. The rolls are driven by cast steel wabblers and cast steel wabbler couplings, direct connected to the herringbone pinion shafts, mounted in the gear housings. Patented roller bearings are used.

The herringbone pinions shown in Fig. 3, constitute a special feature of the mill. They are two pitch, 13 in. pitch diameter, with a 14-in. face, each having a 7-in. face, made right and left, and are forced over a crucible

steel shaft which has its bearings in the housings. The pinions are steel forgings and all the teeth are cut, which insures an exceptionally accurate drive in the transmission of power to the rolls, securing a uniform, well polished rolling with stock free from wrinkles or waves re-

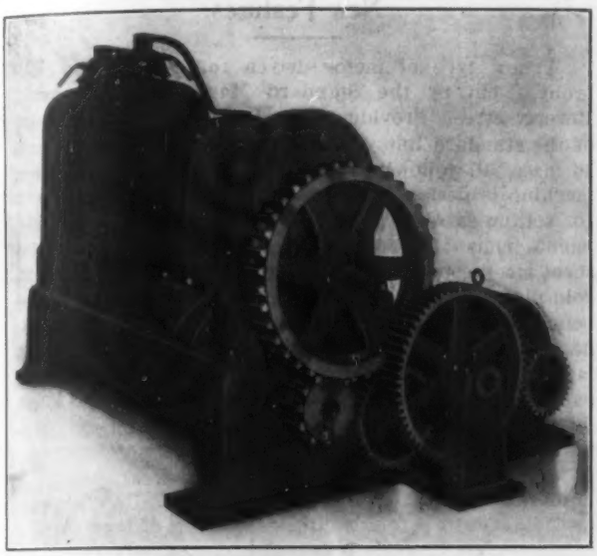


Fig. 2.—View Showing the Driving Gears.

sulting from back lash; or vibrating from strains and other imperfections.

Exclusive of the motor drive and the herringbone pinions the mill is triple trained; taking into account the motor drive, it is four trained, while the herringbone pinions brings the total up to five trains. The total ratio, including all gears, is 84 to 1; the ratio of the motor pinion to the gear is 2.4 to 1; from the driving shaft of the mill to the rolls, 35 to 1. A 50-hp. direct current motor running at 1000 rev. per min. drives the mill. The variable speed arrangement is another new feature, the speed controller being hung in a panel which fastens on the side of the mill.

The roll journals of the mill are 9 in. diameter and 9 in. long; the length of the bed, 10 ft. 2 in.; the overall hight, 8 ft. 6 in., and the floor space, 8 x 15 ft., the total weight, including bed plate, with motor, 27,500 lb.

The main driving gear on the housings and its pinion are of shrouded gun iron, while the other two trains of gear shown in Fig. 2 are of cast iron and have cut teeth. The adjustment is controlled by a spanner arrangement and for heavy strains by offset wrenches which are brought down to the hight of a man's shoulder. The adjusting screws are fitted with micrometer adjustment. The machine is threaded at the roll ends to permit it to be used with a water cooling attachment, special chambers being made on the inner side of the roll. On the chilled iron roll, which is ordinarily furnished, these chambers are cast in two parts on the inner portion of the body, which permits a continuous circulation of water. With hardened steel rolls they are made with a shell on the outside, with a special construction.

The following table gives the principal dimensions and specifications of the mill:

Maximum length of rolls used, inches	22
Minimum length of rolls used, inches	10
Diameter of rolls, inches	12
Pitch diameter of herringbone pinions, inches	13
Face width of herringbone pinions, inches	14
Ratio of gearing	84 to 1
Diameter of roll journals, inches	9
Length of roll journals, inches	9
Length of bed, inches	122
Overall hight, inches	102
Floor space, feet	8 x 15
Size of motor required, horsepower	50
Speed of motor, revolutions per minute	1,000
Total weight of rolling mill, including bed plate and motor, pounds	27,500

In addition to the motor drive, the mill can be furnished with a friction clutch drive, as shown in Fig. 3, or with a silent chain drive.

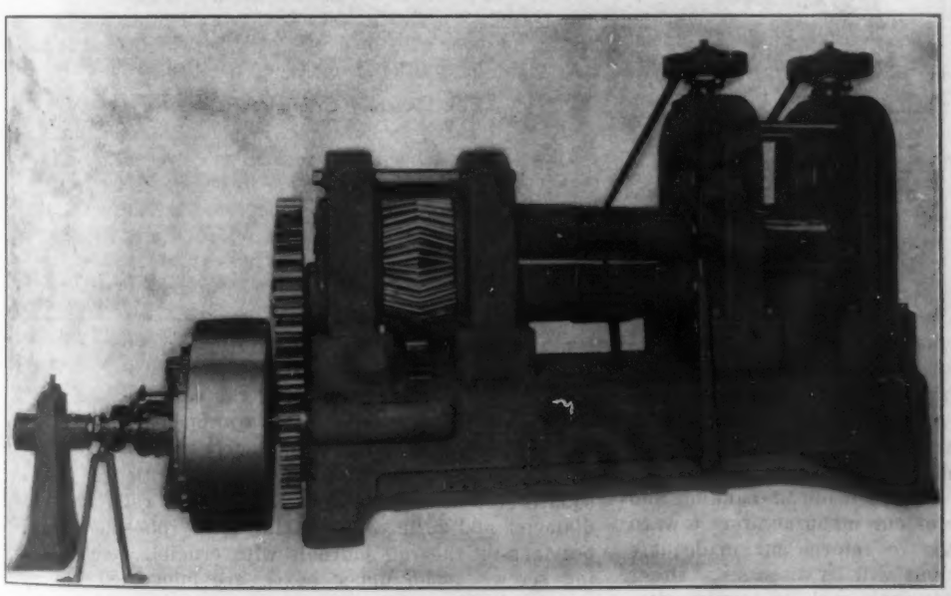


Fig. 3.—The Mill Arranged for Belt Drive with a Friction Clutch.

Petroleum Iron Works Contracts.—The Petroleum Iron Works Company, Sharon, Pa., is operating its plant to nearly full capacity, and its estimating department is figuring on considerable new work, including some for export. It has recently completed the following contracts: American Sheet & Tin Plate Company, Gary, Ind., stand pipe, 20 ft. diameter by 130 ft. high; Republic Iron & Steel Company, Hazelton, Ohio, a stack, 17 ft. diameter by 250 ft. high, and a standpipe 20 ft. diameter and 120 ft. high, while another stack, a duplicate of the first, is nearing completion. A recent shipment consisted of a 30,000-gal. steel tank for oil storage, which went to Brazil. The company has under construction at Yonkers, N. Y., for the Otis Elevator Company, a steel tower, using Bethlehem shapes in the trestle, which is to support a steel tank of 200,000 gal., being 178 ft. above the ground. It recently completed for the United States Government a 12,000-barrel oil storage tank for supplying fuel to oil-burning vessels and smaller storage tanks for gasoline at Providence, R. I.; Norfolk, Va.; Tampa, Fla.; Mobile, Ala.; Charleston, W. Va., and two stations in our island possessions. Considerable oil storage tankage is being shipped to Texas, Oklahoma and other oil fields.

Lee C. Moore & Co., Lewis Building, Pittsburgh, recently shipped fittings for six steel tubing oil derricks to Roumania. The fittings consisted of top and bottom plates, clamps, bolts and U-bolts, weighing 24,000 lb. The appliances are steel forgings for 80-ft. derricks, made extra heavy to withstand the hard usage encountered in the Roumanian oil fields. Tubing for the derricks will be cut at or near the scene of operations, and after the derricks are erected the tubing will be filled with concrete to further strengthen and stiffen them, as ordinary types of derricks have proved inefficient in that field.

Vermillion Iron Ore Explorations

Remarkable Activity Involving a Score of Companies—A Review of the Work Thus Far Done

BY DWIGHT E. WOODBRIDGE, M. E.

There is great activity and interest in iron ore exploration on the Vermillion range of northern Minnesota. This was the original mining district of Minnesota and was the cause of the building of the Duluth & Iron Range Railway in the eighteen eighties. But in spite of various campaigns of exploration, only one ore body was discovered on that range for many years subsequent to the original finds at Tower, where the shipment of ore began in 1881. It now looks as though some mines might be added to those heretofore known, though the great majority of the present active explorations are doubtless doomed to disappointment. The Vermillion range is a difficult and costly region to explore, and knowledge concerning the probable concentration of ore bodies was not as clear 10 or 15 years ago as it is now. These, with other reasons, may account for at least some of the failures of the earlier campaigns of exploration.

The Soudan Iron Bearing Formation

The one ore deposit found on this range, between 1881 and the opening of Section 30 a short time ago, was that of the Chandler and adjacent mines in 1888. From that year to 1907 no new ores were found, for the entire Ely basin may be considered an extension from the Chandler. In 1907 explorations were begun on Section 30, and ore was cut by drills. But this property passed through various vicissitudes before becoming a mine, and its first shipments were made last year to the amount of some 50,000 tons. Between Tower in T 61-15 and the Chandler in T 63-12 is a stretch of country 18 miles long, where there is a series of well defined outcroppings of the so-called "Soudan iron bearing formation" in which are situated all the mines of both Tower and Ely. It seems to be generally recognized that, to permit a concentration of commercial ore from the rocks of the formation and a deposition sufficiently large to make a minable deposit, there must be a comparatively impervious basin in which the solutions may deposit their burden of iron mineral. This fact, though repeatedly referred to in treatises concerning the region, is occasionally lost sight of by those who see in an outcropping of ore and jasper a sufficient reason for carrying out exploration work. But there are several explorations now under way that have borne this fact in mind, and at these the opportunities seem better than elsewhere.

Activity in exploration to-day is due more or less directly to the success of Section 30. When it was generally recognized that ore had been found there and later, when shipments actually began, there was more or less excitement and many companies were organized. Considering the fact that the Vermillion range has shipped more than 30,000,000 tons of high grade iron ore, mostly a Bessemer of excellent physical character, that would bring on the market to-day, say $5 to $6 a ton, that its mines are now in better shape and larger than at any previous period of their history, that at many points the promise of ore is as good as where it has been found, and that a strong and wide formation extends for many miles, the wonder is that exploration has not been more successful than it has in the past.

Present Explorers New to Iron Mining

Contrary to former experiences, most of the present work is in the hands of persons and companies that are not identified with the iron trade and that may be classed as amateurs in the business, so to speak. Most of the financing has been by the sale of stock to the public, largely in Minnesota, in Duluth, Minneapolis, St. Paul and smaller towns. The companies are said to be financed, generally speaking, sufficiently at least for preliminary exploration and development. Some of them have found ore of commercial quality and in promising quantity, and it is reasonable to expect that a few will become successful mines in due time. It is, to be sure, utterly impossible to verify the various reports that are printed in newspapers or that pass current as to what has been found, and only time will tell which of these many properties are actually successful; but I have attempted to make here a brief résumé of operations and prospects at each of the active explorations and to present such information as has been permitted to come out. I cannot undertake, however, to vouch for every statement as to individual property development.

Most of the explorations on the range are near the main line of the Duluth & Iron Range Railway, whose road extends in a quite direct line from Tower to Ely. This road has recently surveyed a preliminary line from its station of Murray to the northwest into the center of one of the new groups of explorations, north of Vermillion lake. Toward this same center the Canadian Northern road has examined, in an informal, preliminary way, a route for a railroad from its main line at the station of Cook, which lies to the southwest of Lake Vermillion. The Canadian Northern also owns and operates a line from Port Arthur, on Lake Superior, southwesterly into northern Minnesota, reaching the easterly end of the Vermillion range, some 50 miles east of Ely, and there is a rumor that it proposes to connect this stub end with its main line from Duluth to Winnipeg, at or near the town of Cook, in which case it will follow the Vermillion range for 75 miles.

The Westerly Group of Explorations

More than 20 explorations are either active at this moment or have been working till very recently and are closed temporarily. In addition to these, whose monthly expenses cannot be far from $100,000, are several that may begin work shortly and on which the preliminaries have been undertaken. The active explorations seem to fall into some four groups, in addition to which are a few isolated operations.

The most westerly of these groups is that on the north and west side of Vermillion lake, along the north line of T 62-15 and in the northwestern part of 62-14. Extending easterly from Pine island toward Mud lake in 62-14 is a very strong iron bearing formation, quite wide at places, and here and there showing outcroppings of good ore. Properties of this group, named from west to east, include the Pittsburgh Iron Mining Company in section 6, and the Vermillion Iron Development Company, section 5—both in T 62-15; the Chicago-Vermillion, section 34; the Rice Bay, section 35; the Scott-Bevier, section 36—all in T 63-15; and the Vermillion Steel & Iron and the Vermillion Steel & Iron Extension, sections 5 and 4, T 62-14. The Vermillion Steel & Iron shaft is 200 ft. deep. East of the Vermillion Steel & Iron Extension is the Irona, which is in its third diamond drill hole. The Pittsburgh is idle. Vermillion Iron Development covers some 380 acres. A working shaft has been sunk 165 ft. vertically; at 140 ft. it cut the steeply dipping formation, and is now bottomed in a slaty hematite that is fairly clean and is improving. This property has not been drilled by the present company, but holes were sunk some years ago by J. S. Lutes, acting for the Biwabik Mining Company, which were not successful. Mr. Lutes acted on the natural assumption that the formation dipped to the north, but this has now been found incorrect, the shaft showing the contrary. The Vermillion Iron Development is to install a generating plant and electric drills. West of the above is the Chicago-Vermillion,

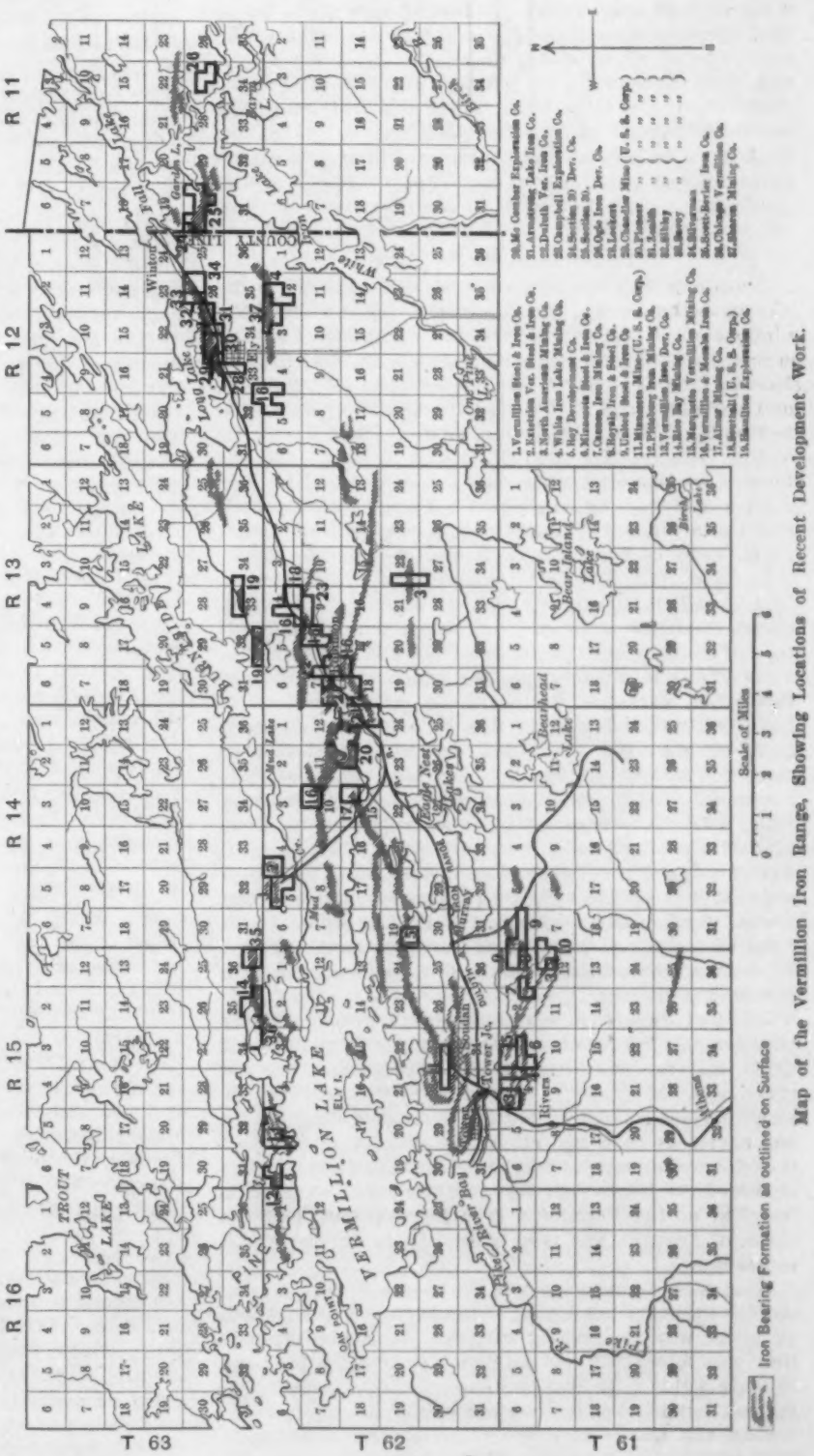
which has done no drilling and is sinking a shaft that is 50 ft. deep and is in the contact between slates and the Soudan formation. The Rice Bay did some drilling, located the same formation, and is sinking a shaft in a banded iron and jasper, which is now down 80 ft. A deep vertical hole is now being drilled, and it is said to have disclosed some excellent ore.

Directly east is the Scott-Bevier, where a drilling campaign of some four years preceded shaft sinking. This drill work was done by means of a shot drill of home manufacture, cutting a 4-in. hole by the use of hardened steel globular shot placed loose at the bottom of a rotating hollow drill. As high as 13 ft. of hard granite has been cut by this machine per day, and it is said to work well and cheaply. One hole was sunk 700 ft. The shaft at this property is now 60 ft. deep. At the Vermillion Steel & Iron two diamond drills were working much of last year and a large amount of trenching and similar work has been done. This company is well equipped with heavy machinery, sufficient for considerable actual mining. Its vertical shaft is down 180 ft. and at 200 it is expected to crosscut to ore that is said to have been found by drills at a higher level. Ore is stated to exist at a point 65 ft. from surface. There are good outcroppings in this vicinity. The Extension has been drilled, and the shaft on the above mentioned property is close enough to the line between these two to develop them both.

The Tower District Group

A second group of explorations lies some 2 miles south of the Tower mines, and includes the North American Iron Company, the White Iron Lake, the Roy and the Minnesota Steel & Iron, as well as some not active. The North American is by far the most pretentious new property on the range. It has a reinforced concrete shaft, three compartment, that is 114 ft. deep, a steel headframe, and all its mine buildings are steel or brick, while its machinery plant is such as would indicate an assured mine of importance. Unfortunately the company broke into water beneath the bottom of its concrete and was forced to pump some 3000 barrels of cement into the interstices of the rock. This company has done a large amount of drilling in the past two or three years, and its president states that one hole was sunk 1800 ft. and was in ore at the bottom. A sample of the core said to be from the bottom is good enough ore to ship. Overlying and forming a wall to the iron bearing formation at this property is a quartz porphyry carrying iron sulphides that are said to average better than $10 in gold, in addition to some silver. This rock is said to be amenable to cyanide treatment. If the figures given are correct there is a vast tonnage of it, and gold mining will become a very important industry on the Vermillion range.

A property of the White Iron Lake Mining Company, lying immediately east of the above, is said to carry this same gold bearing porphyry. Here drilling for iron has been in progress for a long time. East of this is the Roy, now idle, but developed by drilling, a 100-ft. shaft and a crosscut 150 ft. long. Adjoining the Roy is the Minnesota Steel & Iron, which is drilling and testpitting. In section 2 is the Cannon, where a drill campaign has been started.



Map of the Vermillion Iron Range, Showing Locations of Recent Development Work.

North of these last named and immediately to the east of a block of land owned by the United States Steel Corporation extending from its Tower mines to R 14 is the Marquette & Vermillion property. The company has done 1100 ft. of diamond drilling. It is idle just now, but expects to trench and crosscut the surface soon. The latter has done more or less drilling. Both have found the formation to be a banded iron and jasper, characteristic of the district.

Easterly from these and in what I have classed as group three, are the McCue Mining Company, section 10, 62-14; the Almar, section 15; Steward, section 14; the Armstrong Lake, section 13, all in T 62-14, and the Duluth-Vermillion, section 7; the Vermillion & Mesaba, sections 4, 8, 17 and 18; the Campbell, section 9, and the

Southall, section 4, all in T 62-13. All but the Duluth-Vermillion and the Campbell are idle, and these two are drilling. Most of these are located on a long outcrop of hard magnetic banded jasper and iron, extending in a generally direct course for some miles along the shores of Armstrong and Robinson lakes. At the Steward there is a stockpile of some 700 or 800 tons of high grade hematite, taken from workings carried on by exploring syndicates, one of which closed operations but a short time ago after expending a large sum. There is little doubt that more ore is to be found where this was taken out, but nothing is known as to the quantity possible. Southall is a United States Steel Corporation property drilled years ago and found to have ore; its surface ore is a high grade, dense, hard magnetite. It has never been operated nor extensively drilled.

Properties in the Ely Basin

In group four are properties in and adjacent to the Ely ore bearing basin, from which the United States Steel Corporation extracts its highest grade and finest ore, and whose ore bodies are large and deep. The Vermillion & Mesaba Iron Company is in sections 32 and 33, T 63-12, and sections 4 and 5, T 62-12; the Chandler Extension, section 28, T 63-12; the Sharon, sections 2 and 3, and the White Iron Lake, section 2, both in T 62-12, and the Section 30 Development, section 30, T 63-11. The Vermillion & Mesaba has a well defined basin pitching west, and has a number of drill holes in ore, with one shaft 50 ft. deep, of which 20 ft. is ore, and another, 60 ft. deep, in contact between greenstone and ore formation. The Chandler Extension took over a part of the abandoned Chandler mine and has taken out some 25,000 tons of shipping ore from the footwall and has developed some 75,000 tons more, most of which can be shipped this year. Pickands, Mather & Co. are understood to have become interested in this operation by advances made on ore. Whether a new lens has been found, or some ore hidden by slides, &c., has been recovered, I do not know. The Sharon has not yet started work but soon will. The White Iron Lake has been drilling for some years. A shaft is 180 ft. deep, and from this a crosscut is now being driven on the 150-ft. level, in order to cut ore that was said to have been found by drills at lower levels. Section 30 Development is drilling some 300 ft. from where ore in quantity was exposed in the Section 30 company's workings, and is said to have met with encouragement.

Most of these concerns are equipped with machinery plants ample for their needs; many of them have air drills, and the most modern steam generators are not uncommon. Mention has been made of the North American's surface equipment, but the Vermillion Steel & Iron has nearly as good and others are not far in the rear, though none of them have the steel buildings and concrete shafts of the North American. Electric drills are being installed at the Vermillion Iron Development, and the diamond drill, as has been shown, is in extensive and constant use.

Unless conditions change in the course of the next few months these are but a part of the explorations that will be under way the coming summer. It is not expected that any mines will be developed sufficiently to make shipments this year with the exception of Chandler Extension, but if what the various companies say is borne out by the facts, there should be several shippers in 1912 or 1913. And, no matter what may result from this campaign of exploration, the Vermillion range will continue to be a field for prospecting from time to time for a long period. Its outcrops are promising and seductive; its ore, when found, is so good, and it is so near lines of communication, that no one or half dozen unsuccessful campaigns can dull the edge of expectation in the minds of prospectors. But it is somewhat significant that in this present period of activity there is interested no large mining company of experience.

Germany's iron ore production last year reached 28,709,654 metric tons, as compared with 25,504,464 tons in 1909. The Statistical Office places the production of pig iron at 14,227,455 metric tons, as compared with 12,512,257 tons in 1909.

Swank's New Fire Brick Plant

The firm of Hiram Swank's Sons, which established a fire brick works in 1856 in the outskirts of Johnstown, Pa., and which still operates a plant in another section of that town, manufacturing center and bottom plate runner brick, sleeves, nozzles, Bessemer tuyeres, converter bottom brick, &c., has just placed in operation at Irvona, Clearfield County, Pa., on the Pennsylvania and New York Central railroads, a new and modern plant. The capacity of the two plants makes this firm the largest producer in its line in the country. The Irvona property consists of 12 acres of land on which a main brick and steel building, 75 x 300 ft., serves as a tempering department; another building, 30 x 40 ft., contains boilers, engines, wet and dry grinding pans and other machinery for making sleeves, nozzles, &c. At the new plant five kilns are now being operated, and nine additional kilns are under construction.

The firm has an ample supply of clear water and a reserve of 700 to 800 acres of flint fire clay and about 400 acres of coal and plastic clays. Ira E. Matthews is superintendent of the plant. Besides the sales office at 216 East Robinson street, N. S., Pittsburgh, Hiram Swank's Sons contemplate establishing shortly a Philadelphia office. Their Johnstown plant is being operated to capacity on various contracts.

The Rochester Iron & Metal Company's Growth.—The Rochester Iron & Metal Company, with principal office at 325 to 345 St. Paul street, Rochester, N. Y., has filed application at Albany to increase its capital stock from $20,000 to $100,000. This company was incorporated in 1903 with a capital of $10,000, increased to $20,000 in 1906, and the further increase at the present time to $100,000 marks its steady but rapid growth, and places it in the rank of the first dealers of the country in scrap iron and steel and metals. The Rochester Iron & Metal Company at present occupies the grounds of the Genesee Falls Field on St. Paul street and is equipped with all modern facilities for shearing and handling scrap iron of all kinds and dimensions. The equipment includes shears, cranes, drops, railroad scales and direct railroad siding in the yard. Due to the growth of its wholesale business, the company has within the past two years added to its facilities by acquiring a large tract of ground adjoining the New York Central at Portland avenue. It also occupies the Atlantic avenue grounds of the New York Central which are especially reserved for the handling of railroad scrap. Both of these auxiliary yards are equipped with direct railroad sidings and with all other modern facilities. Louis Frankel is president; Charles Frankel, vice-persident; Louis Sarachan, treasurer and manager; Harry Klonick, secretary. These officers and Benjamin Rosenthal comprise the Board of Directors.

The New Jersey Wire Cloth Company, Trenton, N. J., has opened an office and store at 93-95 Pearl street, Boston, Mass., where it will keep a complete stock of its regular products, comprising all grades of cloth and netting made of all kinds of wire, in order to insure prompt delivery of material required in that vicinity. The company has perfected processes for painting, japanning, galvanizing and tinning wire netting, and can meet specifications as to wire of correct size and temper, exactness of mesh, uniformity of crimp and of required finish.

George G. Blackwell Sons & Co., Ltd., Liverpool, England, have published a 12-page pamphlet on "Titanium in Steel and Iron." It is chiefly a reprint of an article dealing with results obtained in the United States by the use of ferrotitanium in the manufacture of rail steel. Reference is made also to a special titanium alloy manufactured for iron foundries. It is stated that titanium iron castings change less in volume under heating and cooling than ordinary castings, and that ingot molds from iron treated with titanium alloy have a longer life. The quantity recommended is from ¼ to ½ lb. of alloy to 100 lb. of iron.

The Machinery Markets

Railroad inquiries have improved, but the carrying companies are buying very cautiously. Instead of sending out comprehensive lists they are issuing inquiries for separate tools, and accordingly it is hard to determine how extensively they are buying. This is especially true in the New York market. In Philadelphia a decided betterment is felt for the first time in some weeks, but most of the business done there is of a single tool nature. The foreign demand for transmission equipment is good in Philadelphia. Railroad inquiries are better in Chicago, where the Northwestern Railroad has a list out asking for bids on $15,000 worth of machinery. The Chicago, Burlington & Quincy will spend perhaps $10,000 for special machinery. In Milwaukee the National Brake & Electric Company is calling for $20,000 worth of mechanical equipment. European business is the mainstay of the trade in Cincinnati at present, although there is a good domestic demand for used machines. The call for machinery is good in some quarters in Cleveland, but most of the orders placed are for single tools. Sales of power equipment are occupying the attention of the trade in the South. In Detroit business is rather quiet, although the automobile demand is good.

New York

NEW YORK, April 19, 1911.

Although new inquiries are scarce, the trade in New York is bidding on a number of large lists, and there are good prospects that they will be closed in the very near future. It is conservatively estimated that the actual lists before the trade call for expenditures aggregating fully $200,000, and this added to the scattered inquiries distributed among the various machinery houses brings the requirements of buyers up to a large figure. The trade is now bidding on a New York, Ontario & Western list, and orders have been closed for some of the forging and upsetting machinery. This company will spend fully $100,000 if it closes for all the machinery on which it is asking bids. The Saurer Motor Company list, mentioned last week, and the Pope Mfg. Company list, each calling for about $50,000 worth of machines, have not been closed yet. In addition to this business, some of the railroads are calling for small lots, but their requests for bids are widely scattered and it is hard to get a line on just how much they are doing. While the machinery houses handling a general line of metal working equipment have nothing to complain of, manufacturers' agents who handle automatics or one or two lines of special tools are not so busy, as there is a decided lack of new enterprises in the way of factory extensions and new manufacturing prospects in this territory. Power equipment people are busy, the demand for that class of material coming principally from electric railroad companies throughout New Jersey and Pennsylvania, many of which are extending their lines.

The Clark Motor Company, Buffalo, N. Y., recently organized, has secured factory premises at Elmwood avenue and the Erie Railroad and New York Central Belt Line, where it will manufacture electric motor trucks and pleasure vehicles. The company controls the Van Wagoner and Clark patents relating to motor suspension and power transmission. A. A. Landon is president and Stanley B. De Long secretary-treasurer and manager, 1738 Elmwood avenue.

Plans are being prepared for a three-story factory, 70 x 350 ft., of reinforced concrete, to be erected this summer by the Lippard-Stewart Motor Truck Company on Elmwood avenue, near Hertel avenue, Buffalo, N. Y., for the manufacture of motor trucks. Thomas R. Lippard is president, 851 Ellicott Square Building.

The plant of the Johnston Harvester Company, Batavia, N. Y., is to be enlarged this summer by the erection of two additional buildings, each approximately 70 x 500 ft., to be used for increasing the capacity of the malleable iron department, so that the company, which is now controlled by the Massey-Harris Company of Toronto, manufacturer of farming machinery, can supply to its Canadian plants at Toronto, Woodstock and Brantford from the Batavia plant all of the malleable iron parts used by them.

The American Pulp & Board Company has been incorporated at Niagara Falls, N. Y., with a capital stock of $20,000, to manufacture pulp-board shooks and boxes of fibrous materials; also to deal in all kinds of paper and in all ingredients, products and compounds thereof. Arrangements will be made soon for a manufacturing plant.

The newly organized Upson Company, Lockport, N. Y., will, instead of erecting a new plant, build an addition to the old Franklin Mills at East Lockport, making the plant modern in all details for its purposes. Electric and water power will be used. The company will be in the market for small electric units, overhead trolley conveyors, shafting and pulleys. Necessary special machinery has already been arranged for. Charles A. Upson is president, Lockport.

The McCall Machine Works has been incorporated at Rochester, N. Y., with a capital stock of $15,000, to manufacture presses, dies, punches and special machinery. The company will take over the business of Arthur H. McCall, manufacturer of dies, punches, &c., 85 Allen street. A. H. McCall will be president of the new company.

The city of Syracuse, N. Y., is having plans prepared for a vocational high school, comprising a power plant, machine shop, foundry and woodworking shop. Henry C. Allen, city engineer, has supervision of the plans.

Business Changes

The McCabe Machine Company has moved its office from 95 Liberty street, New York, to 36 Rapelyea street, Brooklyn, where the company has extensive warehouse facilities.

Chicago

CHICAGO, ILL., April 18, 1911.

Machine tool business in this district is brightening by the inquiries now afloat, and better conditions are evidently in store. Western railroads are showing some indications of breaking away from their long continued retrenchment policy, and among the activities of to-day we note the third of a series of lists issued by the Northwestern Railway, as mentioned in our recent report. This list amounts to about $15,000, and will be purchased at the same time as the two lists previously issued. The Chicago, Burlington & Quincy is inquiring for several special machines which are contemplated for use in some of its shops. The value of these special machines will probably run somewhere around $10,000, and it is expected that lists will be issued in the near future. Bids have been submitted to the Union Pacific by several machine tool concerns in this district on the lists recently issued for Omaha shops. The approximate total of the list is $20,000. The materialization of some of this business will decidedly brighten the machinery sky.

The National Brake & Electric Company, Milwaukee, Wis., is in the market in that district for about $20,000 worth of machinery and tools. Among the purchasing visitors in Chicago the past week have been buyers representing the International Steam Pump Company of Cudahy, Wis., who have bought supplies for general shop improvements.

Inquiries continue to improve and city business still maintains a slight lead over that from the country in daily floor sales.

The Joseph H. Whitehead Company, long and favorably known in Chicago as a dealer in machinists', mill and railroad supplies, has passed into the hands of a receiver. Edwin D. Buell, 98 Jackson street, was appointed by the District Court on April 11 to take charge of the business. Hopes are held out that the company will be reorganized and the business continued.

By the time this publication goes to press the International Harvester Company will have closed pending deals for turbo-generators, air compressors and boilers for its McCormick, Plano and Champion plants. This company will also have closed the purchase of cupolas, tumbling mills and other foundry equipment for its plant at Springfield, Ohio. The amount expended in these purchases totals $250,000.

The Spengler Brothers Company, Rockford, Ill., metal specialties, is contemplating the erection of a new factory building, details of which have not been decided upon.

The Canners' Can Company, Chicago, has purchased a tract of 9¼ acres of land on Western avenue, on which it will eventually erect a factory at a cost of $250,000. Details of the new plant, however, have not yet been decided upon.

The Sprague Machinery Company, Hoopeston, Ill., has been incorporated with a capital stock of $200,000. The

THE MACHINERY MARKETS

incorporators are H. A. Lundahl, J. W. Taylor and R. J. Bieg.

The Rockford Paper Box Board Company, Rockford, Ill., has increased its capital stock from $5000 to $200,000.

The Barry Mills & Elevator, Barry, Ill., were destroyed by fire April 8. The loss will exceed $30,000, partially insured. The plant also furnished the town with electric lighting for the streets.

The plant of the Rawleigh Medical Company, Freeport, Ill., was burned April 7, causing a loss of upward of $100,000.

The enlargement of the plant of the Joliet Steel Construction Company, Joliet, Ill., has been decided upon as a result of the increase in its capital stock from $25,000 to $60,000. F. D. Mateer is the president and general manager.

The Marion Pressed Brick & Tile Company, Marion, Ill., has been incorporated with a capital stock of $10,000. The incorporators are E. C. Forbush, W. H. Warder and H. V. Ferrell.

The Aluminum Goods Mfg. Company, Manitowoc, Wis., will soon have plans completed for the construction of a factory building, 300 x 400 ft., and a power house and service tower. The power house will be of 300 hp. capacity, direct connected to generator. All equipment will be run in group system with motor on each line shaft.

The United Refrigerator & Ice Machine Company, Kenosha, Wis., has been incorporated with $750,000 capital stock. The company has absorbed the plant of the Racine Refrigerator & Ice Machine Company, and will make extensive additions to the factory buildings and equipment. About $100,000 will be expended by the company for new buildings and equipment.

The City Council of Sparta, Wis., has been authorized to issue bonds in the sum of $15,000 to be used for making improvements to the city's water works system.

The Advance Mfg. Company, Racine Junction, Wis., manufacturer of curry combs, is contemplating the erection of a new factory building for its rapidly increasing business.

The Phillips-Carlton Electric Company, Hankinson, N. D., recently incorporated, will erect a plant of reinforced construction, 48 x 64 ft. The company will install a 72-in. high pressure boiler and a 12 x 36 in. Corliss engine belted to a 75-k.v.a., 2300-volt, 60-cycle, three-phase a. c. generator.

Bonds in the sum of $8000 have been issued by Vail, Iowa, for extension of water mains and new tank.

An election will be held at Roland, Iowa, April 18, to vote on the question of bonding the city for $10,000 for a water works system and $8000 for an electric light plant.

The citizens of Edgewood, Iowa, are encouraging a movement looking to the installation of an electric light plant in that city.

The Crane Company, Chicago, will erect a six-story building on West Fifteenth and Walnut streets in Des Moines, Iowa.

Philadelphia

PHILADELPHIA, PA., April 17, 1911.

While there has been no specific movement in the local machinery market a spotty betterment is reported by some sellers, who have been successful in closing up a few orders against inquiries which have, for the greater part, been under negotiation for some little time. The bulk of the business continues of the small lot order, and sales have been confined almost entirely to single tool propositions, and principally those of the medium and lighter character. So far the month of April will show as a rule a slightly better volume of business than was the case during the first half of March, but on the whole the demand still drags. The demand from the railroads in this district is still of a negligent character; the larger industrial concerns also show little interest in new equipment, the greater part of the buying coming from the smaller users of tools. A scattered demand for special equipment is reported and manufacturers keep moderately well employed, but in few cases are plants operated at anything like full capacity. A fair inquiry for boilers and engines is noted, but negotiations are usually confined to equipment of the smaller powers. In some lines of power transmission equipment a good foreign demand is noted, but that for the general lines of machine tools is very light. The second-hand machine tool trade has not been particularly active, inquiry for special equipment is fair, but the general movement in used machinery and tools drags.

The pattern storage department of the James Barker Company, Inc., iron founder, Sixth and Cayuga streets, was destroyed by fire April 13. A large number of its customers' patterns were destroyed, but they, as well as the building, were fully protected by insurance. The loss is estimated at $30,000. No other department of the plant was damaged. Plans for a new fireproof pattern storage building are being made, and the work of rebuilding will be started at an early date.

John G. Brown, contracting engineer, has begun work on the erection of a large plant, designed by him for the Saurer Motor Company of Asbon, Switzerland, at Plainfield, N. J., where the American plant of that company will be established. When completed the plant will include two one-story brick and concrete buildings, one 80 x 150 ft. and another 100 x 150 ft.

The A. A. Denslinger Machinery Company has been granted a charter under the laws of Delaware, with a capital stock of $50,000. This concern is located at 866 Pallas street, and manufactures special machinery, largely used in the manufacture of shoes.

The A. P. Witteman Company continues to make extensive improvements to its plant at Chester, Pa. It has recently installed a new power plant, equipping it with a 200-hp. boiler and engine installation. This company is now completing arrangements to increase its capital stock from $100,000 to $200,000, in order to take care of its steadily increasing business, and contemplates the erection of an additional machine shop. While plans are not complete, it is probable that the new addition will be 80 x 200 ft.

The old Wilbraham-Green Blower Company foundry buildings, at Cumberland and Amber streets, which have been occupied by the Scott & Williams Company for some time in the manufacture of knitting machinery, have been purchased by the latter. No further additions or improvements to the plant are contemplated at this time.

The North Brothers Company, American and Lehigh avenues, is taking bids through Wm. Steele & Sons, for the erection of a brick and concrete addition to its factory building. This addition is to be five stories, 60 x 100 ft., and will provide increased facilities for a number of its manufacturing departments.

The Chester Lace Mills, Chester, Pa., will, it is stated, make considerable improvement to its power plant. Particulars are not available, but it is reported that the power house is to be enlarged, new boilers installed, and the efficiency of the plant increased 50 per cent.

The Philadelphia & Reading Railroad has awarded the contract for the erection of a new concrete arch bridge over the Delaware River, at Yardley, to F. M. Talbot & Co., 1 Madison avenue, New York. The bridge is to consist of 14 arches, and will carry two tracks, and replace a steel bridge which has been in use at that point for a number of years.

The Consumers' Light & Power Company, Reading, Pa., has given notice of its intention to apply for a charter April 26 empowering it to manufacture, distribute and sell electricity in that vicinity. The incorporators named are T. J. Connelly, J. A. Murray and Thomas A. Dunn.

Efforts by means of a taxpayers' suit to have the contract recently awarded by the city of Philadelphia to W. S. P. Shields, contractor, for the building of the superstructure of the Vine street pier, who also had the contract for the substructure, declared illegal, owing to his not having been the lowest bidder, were unsuccessful. The lowest bidder did not pay, it was stated, the union scale of wages, as provided by the specifications, nor did the city wish to divide the responsibility of the work between two contractors, which might have resulted in delays had the work been given the lowest bidder.

St. Louis

ST. LOUIS, MO., April 17, 1911.

The Scott Gasoline Rock Drill Mfg. Company, St. Louis, has filed articles of incorporation, with $500,000 capital stock. It is the intention of the company to establish a factory in St. Louis for the manufacture of a drill invented by Louis L. Scott. The drill is attached directly to the cylinder of a gasoline engine, doing away with the use of a steam plant, air compressor and hose in drilling rock and other substances. The machine is being manufactured under contract at present. The incorporators are Louis L. Scott, John R. Williams, Samuel D. Martin and others.

The H. D. Williams Cooperage Company, St. Louis, has increased its capital stock from $200,000 to $750,000. The company's principal plant is at Leslie, Ark., where it owns a railroad. It has a storehouse at 118 North Commercial street.

The Acme Hoisting Machine Company, St. Louis, has been incorporated, with a capital stock of $50,000. The incorporators are F. R. McCune, Geo. S. Cornell and John M. Patke. The company will manufacture hoisting and power, illuminating, excavating and carrying machinery.

The Continental Motor Equipment Company, St. Louis,

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has been incorporated, with a capital stock of $25,000. The incorporators are N. H. Davis, John Shuford and H. S. Gilbert.

The National Railways Valve Gear & Equipment Company, St. Louis, has been incorporated, with a capital stock of $200,000. The incorporators are L. A. Wind, I. F. Watkins and D. L. Price. The company will manufacture valve gears and other railroad equipment.

During the tornado which prevailed here April 13 the Burlington elevator was partially destroyed, involving a loss to the building, machinery and grain estimated at $150,000.

The St. Louis Screw Company, St. Louis, has been incorporated, with a capital stock of $200,000. The incorporators are Edward J Miller, Walter S. Ashton, Geo. Gruenewald, Henry J. Jaeger and Charles Niekamp. The company is engaged in the manufacture of screws.

The C. A. Wood Preserver Company, St. Louis, has been incorporated, with a capital stock of $10,000. The incorporators are M. F. Gerhard, H. H. Gerhard, H. A. Giesen and others. The company will manufacture wood preservers and wood preserving processes.

The Standard Spring Wheel Company, room 407, Reliance Building, Kansas City, Mo., recently incorporated with $100,000 capital stock, expects to establish a factory in the near future to manufacture spring wheels for automobiles.

F. S. Ackerman and associates of Chicago have bought the electric light plant of the Eureka Springs Electric Company, Eureka Springs, Ark. The deal includes the properties of the street car system, lighting and ice plants.

A. P. Kincade of Scranton, Ark., in addition to arranging for erecting a $10,000 cotton gin, has applied for a franchise for an electric light system to be installed at that place.

Cincinnati

CINCINNATI, OHIO, April 18, 1911.

Machine tool builders are somewhat disappointed with spring business, but if every line of manufacture was considered, conditions in this territory might be reported as being nearly normal. In spite of long delayed orders for tools that were expected from certain quarters, there is generally an optimistic feeling. Many local manufacturers have been impressed with the importance of having a foreign trade to keep their factories busy during slack periods, and European business appears to be more attractive for machine tool builders than that from any other part of the world, although considerable attention is being aroused in the Spanish-American field.

Second-hand machinery dealers report a fairly good business in small machine tools, but used sawmill equipment is moving very slowly. Manufacturers of sawmill machinery, on the other hand, state there is a slow but steady increase in orders received.

The Alvey-Ferguson Company, Louisville, Ky., manufacturer of conveying machinery, has bought a site of four acres at Oakley, Cincinnati suburb, and plans will be prepared at an early date for the erection of a large manufacturing plant. It has not yet been announced whether the company will have its own power plant or will obtain its power and light from the large central plant at Oakley.

President M. A. McGuire of the Vulcan Trunk Company, 608 Vine street, Cincinnati, confirms the report that his company has acquired a manufacturing site on Spring Grove avenue, on which will be erected a trunk factory. No plans have yet been drawn up.

The Niles Tool Works Company, Hamilton, Ohio, advises that the building for its new foundry has been completed, but that it will be about 60 days before the equipment is installed and the addition in operation.

The Indian Refining Company, whose headquarters have heretofore been in Cincinnati, has decided to move its executive department to New York. A branch office, to take care of Western business, will be maintained in the First National Bank Building.

The Lowe Bros. Paint Company, Dayton, Ohio, has commenced work on a factory building that will have a total floor space of 30,000 sq. ft.

It is reported that the Dayton Engineering Laboratories Company, whose headquarters have heretofore been in Chicago, has leased the Beaver Power Building in Dayton, Ohio, and will hereafter manufacture its special automobile parts in the last named city.

The J. A. Fay & Egan Company, Cincinnati, confirms the report that it intends moving its manufacturing plant from the present location on Front street to Bond Hill suburb, where a large site has been secured. Delay in extension of a car line has held up building plans, but this matter is expected to be arranged shortly.

Plans for the large car repair shops recently mentioned, to be erected by the Cincinnati Traction Company, have not yet been completed. The two shop buildings will be about 150 x 250 ft., and in addition there will be an immense car barn. The total building expenditure will be in the neighborhood of $250,000.

The Industrial Club of Covington, Ky., was recently incorporated with the primary purpose of inducing manufacturers to locate in that city. Its membership increased so fast, however, that clubrooms were secured and social features were added. Richard S. Stewart of the Stewart Iron Works will be the first president.

The A. J. B. Ice & Storage Company is a new incorporation at Parkersburg, W. Va., with $50,000 capital stock. W. F. Thayer and Robert Wilson of Parkersburg are named among the principal incorporators.

To manufacture seed separators the Benson Mfg. Company was incorporated at Buchanan, W. Va., with $25,000 capital stock. The incorporators are O. B. Beer, T. P. Sexton, W. L. Talbot, A. Layfield and F. M. Carpenter.

The Avon Coal Company, Cincinnati, is a new incorporation with $100,000 capital stock, formed by A. Cunninghame, Daniel McLaren, Walter J. Friedlander and Harry Levi of Cincinnati, and J. H. Keyes of Terre Haute, Ind. It is the purpose of the company to begin mining coal in West Virginia at an early date, and later coke ovens will be installed. The company has a lease on about 1500 acres of coal lands that are yet undeveloped.

Cleveland

CLEVELAND, OHIO, April 18, 1911.

The local machinery and machine tool market continues quiet. Dealers are getting no inquiries of any size, but are doing a moderate amount of business in single tools. Some of the builders report an improvement in inquiries and a better outlook than a few weeks ago. While some manufacturing plants in metal working lines are complaining of a scarcity of orders others have about all the work they can do. Plants making agricultural implements and other products used largely on farms are very busy. While there are about the usual number of new concerns being organized to engage in metal working lines, these companies are mostly small ones for the manufacture of specialties and require but little in machinery equipment. In spite of the inactivity in some lines very little good second-hand machinery is being placed on the market. The demand for electrical equipment, which improved recently, continues fairly active. The demand for mill supplies is quite good.

The general contract for the new plant to be erected in Cleveland by the Taylor & Boggis Foundry Company has been let to John Gill & Sons, Cleveland. Plans for the plant and number of buildings have not yet been decided upon. The plant will include a large foundry and one or more buildings for the manufacture of builders' hardware.

The Cleveland Auto Spring Company has been incorporated with a capital stock of $15,000 by H. F. Ehlert, J. A. Flajole and others. The company will manufacture a new automobile spring. It will occupy a plant containing 5000 sq. ft. of floor space, to be built for it on Scranton road, by the Bradford Carter Estate.

The National Electric Lamp Company has purchased a 30-acre site at Euclid avenue and Noble road, East Cleveland, and is having plans prepared for a group of buildings, including a power plant, engineering and testing departments, chemical laboratory, executive offices, &c. Its present large plant at Hough avenue and East Forty-fifth street will not be moved.

The Service Recorder Company, Cleveland, has been incorporated with a capital stock of $60,000 to manufacture an automatic time recorder for vehicles. A plant will be provided, which for the present will be used only for assembling. F. Baumgertner and others are interested in the company. The incorporators are H. R. Cool, Richard Inglis, F. A. Quail, J. C. Barkley and E. Denner.

The Cleveland Autocraft Boat Company, now located at 1036 West Eleventh street, Cleveland, will build a new plant in Lorain, Ohio, which it expects to have ready for occupancy November 1. The present company will be reorganized and its capital stock increased to $100,000. Machinery equipment will be required for the new plant. The company makes steamboat tenders and small wooden boats of various kinds.

The Crystal Paper Company, Amanda, Ohio, has awarded contracts for the erection of a paper mill and power house, 50 x 500 ft. It will be of brick, steel and reinforced steel construction.

The Krouse Konstant Carburetor Company, Cleveland, has been incorporated with a capital stock of $15,000 by

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R. E. Krouse, Edward Younger, F. G. Castle, F. E. Pfeiffer and W. K. Caldwell.

The annual dinner given by the metal trade manufacturers of Cleveland to their shop superintendents and foremen will be held at Wohls' Hungarian restaurant April 29.

The Silver Mfg. Company, Salem, Ohio, is increasing its foundry capacity by the erection of a new building, now under construction, 54 x 116 ft.

The National Fire Proofing Company, Canton, Ohio, will double the capacity of its plant at Magnolia, Ohio, by the erection of a new one-story concrete building, 65 x 157 ft.

The Economy Switch Box & Mfg. Company, Sweeney avenue, Cleveland, has increased its capital stock from $5000 to $25,000, to provide for the growth of its business.

The Standard Tool Company, Cleveland, has increased its capital stock from $1,000,000 to $1,500,000.

The Board of Trade of Canal Dover, Ohio, is making efforts to secure a steel plant for that city, and has appointed a committee to gather information concerning the project.

The Star Drilling Machine Company, Akron, Ohio, has purchased an 8-acre site in Los Angeles, Cal., where, it is announced, it will erect a factory for the manufacture of oil, gas and water well machinery. It is reported that the company will spend about $150,000 in the erection of a plant.

The village of Logan, Ohio, is preparing plans for an electric light plant.

It is announced that the Lake Shore Railroad Company will erect two machine shops on the Union and Superior docks at Ashtabula, Ohio, one 40 x 120 ft. and the other 63 x 130 ft.

New England

BOSTON, MASS., April 18, 1911.

The market for machinery shows little variation from the conditions which have existed for a month past. Manufacturers of grinding machinery are finding a good business, though they could take care of more orders. The Brown & Sharpe Mfg. Company, Providence, R. I., reports that its great works are producing in large volume, with considerable foreign business, but with the bulk of the new orders from American customers.

W. A. Viall, superintendent of the Brown & Sharpe Mfg. Company, sailed last week for a European trip.

The Norton Grinding Company, Worcester, Mass., manufacturer of grinding machines, has decided to make large additions to its works at Greendale. The present plant consists of two buildings, each 84 x 260 ft., connected at the front by a structure 40 x 75 ft. The addition will consist of a third shop unit, 84 x 260 ft., connected with the remainder of the plant by a brick building the duplicate of the present intermediate structure. The main building will be devoted to a general extension of the machine shops. Like the other buildings, it will be one story, with monitor roof, and with broad galleries extending around three sides, to take the lighter machinery. The open space of the main floor will be served by a 10-ton traveling electric crane. The floor will be of special construction, so heavy that the largest types of grinders built by the company may be set anywhere for testing. The second floor of the connecting building will be devoted to the drafting rooms and the lower to storage. The business of the Norton Grinding Company has grown with extraordinary rapidity. The first shop was only a part of the first large building, and was occupied in 1902, shortly after the business was established. The building was soon extended, and four years ago it became necessary to duplicate it and erect the office building. Now the growth of the industry has reached the point where the plant is again inadequate for the needs of the business.

The business of L. H. Snyder & Co., Bristol, Conn., manufacturers of floor and ceiling plates, has been incorporated in Connecticut with capital stock of $30,000, the incorporators being Lyman H. Snyder, Flora C. Snyder and Losee B. Snyder. The management will remain unchanged, but it is the intention to increase the business materially and the factory will be enlarged at once.

The Galpin-Griffen Mfg. Company, Hotchkissville, Conn., has been organized under a Connecticut charter, to manufacture handles, faucets and measuring poles and to do a general wood turning business. The factory will be located in Hotchkissville and will be operating in about two months. The incorporators are Thomas G. Galpin and W. A. Galpin, both of Hotchkissville, and James E. Griffen, Waterbury, Conn.

The Norton Company, Worcester, Mass., manufacturer of abrasive wheels, including the alundum products, will build a four-story addition to its plant at Worcester, 24 x 40 ft., of brick and steel.

The Wyman & Gordon Company, Worcester, Mass., manufacturer of drop forgings, has secured several lots of land adjacent to its premises in Worcester, but has nothing to say as yet as to plans for the development of the property for its manufacturing purposes.

The International Silver Company, Meriden, Conn., will build an addition to its Factory B, otherwise known as the Derby Silver Company, Shelton, Conn. It will be used for a plating room and no additional equipment will be installed.

The repair shop of the Boston & Maine Railroad, Sanbornville, N. H., was burned April 8, with a loss to contents of $10,000. Doubt is expressed as to whether the shops will be rebuilt.

The local press states that the Writerpress Company, Buffalo, N. Y., will remove its business to Shelton, Conn., and will occupy a brick building about to be erected for the Shelton Business Men's Association, 40 x 100 ft., three stories.

The American Writing Paper Company will establish a new power house at the Crocker Division, Holyoke, Mass., to cost $35,000. A steam plant will be installed, to supply the division.

The Pejepscot Paper Company is erecting a large pulp mill at Topsham, Me. Another large pulp and paper project is announced in connection with the creation of additional water power at Shawmut, Me., in the Kennebec River, above Waterville. The paper and pulp mills require repair shops of some size. Other additions to New England industries just announced follow: Standard Fabric Company, Fall River, Mass., new mill, 92 x 200 ft., three stories; E. A. Mallory & Sons, Inc., Danbury, Conn., addition, 40 x 105 ft., four stories; American Hosiery Company, New Britain, Conn., additional story to a building, 26 x 92 ft., and a three-story addition, 20 x 25 ft.; Gagnier & Angers, Springfield, Mass., manufacturing and storage building, 50 x 102 ft., six stories; Fletcher Mfg. Company, Providence, R. I., textiles, one-story addition; Henry J. Perkins Company, Springfield, Mass., large concrete and steel building, in which cold storage equipment will be installed.

The Meriden Board of Trade Industrial Corporation, Meriden, Conn., states that its purpose is to erect a building or buildings in which small manufacturers who have insufficient capital to own their own buildings can find a place to operate. The city has had many opportunities in the past to secure small or young manufacturing concerns had a factory been available for them. It has, therefore, been deemed wise to establish this new company.

The Connecticut Legislature has passed an act authorizing the Crane Valve Company, Bridgeport, to increase its capital stock from $800,000 to $5,000,000. The company states that this is merely a permission secured at this time because the Connecticut Legislature does not meet again for two years. No intention exists of issuing the new stock for the present.

Detroit

DETROIT, MICH., April 17, 1911.

Manufacturers report the past week as rather quiet in point of orders, but are not looking to the continuance of such conditions for any length of time. One thing that is pleasing to motor car manufacturers is the fact that they are carrying no stock, but almost universally are behind in their orders. Building operations are picking up, with plenty of structural work ahead. Automobile makers are fighting a bill pending in the Legislature which will make automobile companies adopt the United States standard thread for all screws used in the manufacture of the motor car. As nearly every motor car company uses a thread especially adapted to the motor car, it is easily seen that the switching over to a new standard would mean considerable loss to them. Manufacturers in general are helping to defeat the bill.

The Adjustable Hub Company has been organized here to make a patented automobile hub. The company has a capital stock of $100,000. W. F. E. Woodhouse and A. V. Woodward are prominent stockholders. The company will build a plant in this city.

The Detroit Aeronautic Construction Company is being incorporated this week, with a capital stock of $65,000. A factory is being planned to manufacture motors and planes on a large scale. Max Dingfelder, Emil W. Snyder and John T. Patterson are the principal stockholders.

The Farrand Organ Company of this city is planning several improvements. The main item is the erection of a two-story factory building, to cost in the neighborhood of $20,000.

The Piedmont Graphite Company, which is now located at Atlanta, Ga., is to move its large plant to this city. The company has purchased a factory site on Jefferson avenue

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and will erect a modern plant. The electric process will be used for graphite refining. William Reinke is the Detroit manager.

One of the most important building projects of the past week is the proposed new plant of the Commercial Milling Company. The company plans to erect a 25,000-barrel mill, with 16 storage tanks of 250,000-barrel capacity. The mechanical equipment will include a cross compound condensing engine of 250 hp. Robert Henkel is president.

The Adrian Cereal Company, which has been operating a small mill near Adrian Mich., is to engage in business on a much larger scale. Robert McFall, who has the company's affairs in hand, says that the company will build a mill in Adrian early this summer.

The Edward Hines Company, Chicago, Ill., has bought out the Gogebic Lumber Company, a Grand Rapids enterprise, and will build extensively at Marinesco. The deal included the purchase of the sawmill and lands and involved about $1,000,000.

Albion, Mich., is to have an aeroplane factory. The work of organization is in the hands of R. Wilcox of Detroit, formerly of the Detroit Aeroplane Company, and he has announced his intention of erecting a plant at the former city.

A roundhouse, to cost in the neighborhood of $30,000, is to be erected at Port Huron, Mich., by the Pere Marquette Railroad. The erection of the roundhouse is in line with other improvements included in the recent loan.

A brickmaking concern of importance is the South Michigan Brick Company, Kalamazoo, Mich., which has been incorporated with a capital stock of $40,000. Resident stockholders are John L. Jackson, Sheldon Ruby and S. O. Church.

The Detroit Cushion Tire Company has been organized in this city, with a capital stock of $100,000. The tire is the invention of a Detroit man.

The Waterloo Woolen Mills, Monroe, Mich., has been taken over by Ed. J. Lauer and I. S. Harrington of the same city. The new owners plan considerable improvements.

The G. W. Bunker Company, Grand Rapids, Mich., filed articles of incorporation last week, with a capital stock of $85,000; will take over the business of the Bunker & Wallin Company and will conduct a general engineering business.

The plant of the Grand Rapids-Muskegon Power Company, with headquarters at Grand Rapids, Mich., is to be increased by the installation of a new 10,000-hp. turbine. The business of the company has rapidly increased, making the enlargement necessary.

The Newaygo Engineering Company, Newaygo, Mich., has begun the erection of a new factory building, 50 x 160 ft., three stories. Besides separator machinery, the company will make various engineering parts.

Another Newaygo enterprise reported by the Newaygo Business Men's Association is the enlargement of the plant of the Henry Rowe Mfg. Company. The company will build a large factory addition late this spring and will materially increase its force of men.

The International Milk Products Company will erect a plant at Standish, Mich., with a capacity of 30,000 lb. per day.

Hillsdale, Mich., is in the market for a 300-kw. generator to be used in connection with a turbine engine. The Hillsdale municipal lighting plant will spend $12,000 in improvements.

Whitehall, Mich., is to have a large canning factory. George Miller of the same city will ship the machinery of his basket making plant to a northern city and will replace it with canning machinery.

The New Century Rod & Bait Company, Holland, Mich., and the Bowler Mfg. Company, Chicago, Ill., have consolidated under the name of the Holland Sporting Goods Company. The new company has a capital stock of $50,000 and will occupy a big cereal mill in Holland.

If present plans carry, Detroit will spend $3,500,000 on improvements to its water works system and plant. Circulars are being distributed by the Board of Commerce advocating the plan, which has a large following.

The East Side Lumber Company, Saginaw, Mich., has purchased the plant, buildings and machinery of Wm. T. Cooper & Sons of the same city. Considerable repairs and improvements will be made by the new company.

The A. F. Anderson Lumber Company, whose plant at South Bordman was burned out two months ago, will rebuild its factory at Cadillac, Mich., if present plans carry. The company desires better shipping facilities.

The Erb Motor Car Company, Saginaw, Mich., has increased its capital stock from $25,000 to $40,000. The company is planning to make several improvements to its plant to enable it to increase the capacity.

The Douglas & Lomason Company, Detroit, manufacturer of brass wind shields and storm fronts for automobiles, is erecting a factory building, 80 x 160 ft., of reinforced concrete construction, to be equipped with the latest improved machinery electrically driven from a generator in its own plant.

The Celfor Tool Company, Railway Exchange Building, Chicago, Ill., is erecting a small steel foundry at Buchanan, Mich., but states that it will not be in the market for any equipment.

Escanaba, Mich., has voted $30,000 in bonds to construct a municipal gas plant, work upon which will be commenced as soon as possible.

Toronto

TORONTO, ONT., April 15, 1911.

Construction work is being delayed by the backwardness of the spring, and the movement of merchandise is being somewhat retarded by the deferred opening of navigation, when lower freight rates come into effect. But there is no lack of confidence in the outlook. A busy season is being expected, and manufacturers and conductors of commercial enterprise generally find no difficulty in making financial arrangements for normal operations. Concerns with an established connection are apparently having no trouble in getting their fair share of the orders that are being placed, notwithstanding that competition from outside is more plentiful and more active than ever. The recent announcement of the Finance Minister that the British preference would not at present be increased and that the Knox-Fielding reciprocity agreement included all the tariff changes contemplated this year gave satisfaction in manufacturing circles and lifted a load of uncertainty off the minds of many. The plans of the Ontario Hydroelectric Commission to spread out its transmission system in the western and eastern districts of the older part of the Province foreshadows much new business, not merely in supplying material and equipment for the commission, but also in the furnishing of distribution plant to the various towns and cities to be served. Six hundred and fifty thousand dollars will be required, according to the estimate of the chairman of the commission, to install a transmission system in eastern Ontario and about $1,500,000 to install one in western Ontario, not to speak of the millions that will be required for distributing works in the municipalities served. The Electric Power Company, whose head office is in Toronto, now controls a great group of operating companies, in the extensive and flourishing region known as the Trent Valley, in Ontario. It is expected that under the new holding company large expenditures will be made to develop power rights owned by a number of these operating companies, to improve the plants of others and to extend the range of their transmission systems. The activity of the Ontario Hydroelectric Commission is impelling certain of these companies to action. As the Trent River is under Dominion jurisdiction, it being a navigable river in course of canalization by the Dominion Government, the Ontario Hydroelectric Commission cannot interfere with the arrangements of the Electric Power Company and its component corporations. The incorporation of the $10,000,000 British Canadian Shipbuilding & Dry Dock Company, Toronto, and the agreement between the Vickers-Maxim Company and the Montreal Harbor Commission for the building of a dry dock, ship repair plant and steel plant are features.

The Deputy Minister of Marine and Fisheries, Ottawa, is calling for tenders, to be put in by May 1, for the construction of two twin screw gasoline launches for the fisheries patrol service. They are to be equipped with two 34-hp. gasoline engines.

Work is about to be begun upon the construction of the plant of Steel & Radiation, Ltd., at St. Catharines, Ont. It is to occupy 30 acres adjacent to the property of the Yale & Towne Company and is to cost $125,000.

Specifications have been prepared and tenders are about to be invited for the construction of Montreal's filtration plant. The work, which is to be completed by September, 1913, is to cost about $2,000,000. There are four contracts to be let—one for the installation of 10 pumps, one for the prefilter, one for the main filter and one for the concrete covering for the filter beds. The capacity of the plant is to be of 50,000,000 gal. per day.

Up to April 25 tenders will be received by the Mayor of Toronto for testing transformer, also for lightning arresters.

Tenders will be received by the Mayor of Toronto to April 25 for a priming equipment for centrifugal pumps at the municipal filtration plant.

Alex. Cross & Sons, Ltd., Glasgow, Scotland, will shortly begin the construction of a $100,000 fertilizer plant at Sydney, N. S.

The Albert Mfg. Company, Hillsboro, N. S., will rebuild its plaster mill at a cost of $100,000.

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It is reported that the Municipal Council of Thessalon, Ont., will install an electric lighting plant and power house.

Albert Vickers and V. Caillard, for the Vickers-Maxim Company, have entered into an agreement with the Montreal Harbor Commission for the building and operating of a dry dock and ship repair plant at Montreal. The Vickers-Maxim people agree to organize a Canadian company, under the name Canadian Vickers, Ltd., with a capital stock of $5,000,000. There are to be engine and boiler shops, a foundry and an efficient steel working shop, the whole cost, including that of the dry dock, to be at least $2,000,000. The Harbor Commission undertakes to give certain location privileges and to accept a certain rental.

The Erie Tobacco Company, Windsor, Ont., has arranged for the building of a large factory at Kingsville, Ont.

J. Waterson & Co., Ltd., has been incorporated as a Dominion company to manufacture iron and steel, &c. The capital stock is $250,000, the head office Montreal.

The British Canadian Shipbuilding & Dry Dock Company has been incorporated as a Dominion concern, with very large powers relating to the class of enterprise indicated in its name. The incorporators are all prominent men. They are Sir Henry Pellatt, Toronto; J. M. Gibson, Lieutenant-Governor of Ontario, Toronto; Charles Ellis, Clydebank, Scotland, managing director of John Browne, Ltd.; Alexander Gracie, Glasgow, Scotland, chairman of the Fairfield Shipbuilding Company, and Alexander C. Ross, Sydney, N. S. The company's capital stock is $10,000,000. Its head office is to be in Toronto, but its charter gives it the power to operate in any part of Canada.

It is announced that the Lake Superior Paper Company, which purchased the Lake Superior Corporation's pulp mill at Sault Ste. Marie, Ont., will spend $2,000,000 on its buildings and plant.

The Gillette Safety Razor Company, Boston, Mass., is about to erect a plant for the manufacture of its safety razors at Montreal, Canada. Plans are now being prepared by Lockwood, Green & Co. of Boston, who will be the engineers in charge. The factory is to be 76 x 105 ft., six stories, of reinforced concrete construction throughout, and to contain approximately 52,000 sq. ft. of floor space.

The Canadian General Electric Company, Ltd., has leased the large plant of the Canadian Ship Building Company on the Niagara River, at Bridgeburg, Ont., opposite Buffalo, N. Y., for the use of its structural steel department.

Indianapolis

INDIANAPOLIS, IND., April 18, 1911.

The Foxworthy Electric Company, Indianapolis, has been incorporated, with $10,000 capital stock, to manufacture electrical supplies. The directors are M. K. and E. H. Foxworthy and L. R. Miller.

The Bell Piano Company is preparing plans for two factory buildings in Muncie, Ind.

Morton Bros. & Co. have been incorporated at Washington, Ind., with $10,000 capital stock, to manufacture concrete blocks, drain tile, &c. The directors are Zed Morton, L. E. Hamersley and P. A. Hastings.

The Clay Products Company, Brazil, Ind., has increased its capital stock from $50,000 to $150,000. C. F. Shannon is secretary of the company.

The Caswell-Runyan Mfg. Company, Huntington, Ind., maker of cedar chests and boxes, will double the capacity of its plant.

The Hunter Brothers Stone Company, Bloomington, Ind., has been incorporated, with $5000 capital stock, to quarry stone. The directors are John A., Morton T. and M. M. Hunter.

The W. R. Clark Mfg. Company has been organized at Muncie, Ind., with $30,000 capital stock, to do a manufacturing business. The directors are William R. Clark, F. H. Bartle and E. J. Reisner.

The Rensselaer Commercial Club, Rensselaer, Ind., has a working fund of $10,000 and owns a 75-acre tract of land adjoining the city. It is looking for an industry and offers to pay well to induce one to locate in its city.

A Business Men's Association has been organized at Delphi, Ind., with Dr. H. M. Hall as president and F. G. Armick secretary.

The C. & L. Company, South Bend, Ind., has been incorporated, with $9000 capital stock, to operate zinc and lead mines. The directors are J. H. Chandler, J. H. Loughman, F. J. Loughman, A. P. Hubbard and J. R. Jordan.

The East Bedford Stone Company, Bedford, Ind., has been incorporated, with $10,000 capital stock, to quarry stone. The directors are William Shryer, Charles Stasting, William Bahr, John Rager and John Quayle.

The Wearwell Rubber Company, Marion, Ind., has increased its capital stock from $9000 to $15,000. It will move to Kokomo, Ind. G. B. Van Aukin is president of the company.

The Consolidated Automobile Company, Anderson, Ind., has been incorporated, with $50,000 capital stock, to manufacture automobiles. The directors are Henry Nyberg, Harry Hamilton and P. H. Doyle.

The Bell Brothers Piano Company, Muncie, Ind., has commenced work on the construction of two factory buildings, one of which will be 60 x 130 ft., two stories, and the other 60 x 130 ft., three stories. A full equipment of woodworking machinery will be installed after completion of the buildings.

The LaGrange Electric Light Company, LaGrange, Ind., will commence work in the near future on the construction of a new electric light plant to be equipped with new machinery. Definite plans have not been decided upon.

Ducas & Harp have started a brass and aluminum foundry at Anderson, Ind., and will install a polishing and plating department in the near future to be operated by motor power.

The South

LOUISVILLE, KY., April 18, 1911.

The demand for machinery continues good and the number of new projects which are being announced seems to insure active business for some time to come. Sales of power equipment continue to lead in point of volume. Dynamos, motors and other electrical equipment are selling well. Contractors' outfits continue to form an important item in the total of sales being made.

The Bray Clothing Company, Louisville, which has purchased the buildings of the Kentucky Woolen Mills, has let contracts for the equipment which it will install. The Lane & Bodley Company, Cincinnati, will build a Corliss engine; C. J. Walton & Sons, Louisville, have the contract for the boilers and smokestack, and the motors will be supplied by the James Clark, Jr., Electrical Company, Louisville.

The Henry Vogt Machine Company, Louisville, will install a 75-hp. boiler in the plant of the Southern Brick & Tile Company of this city.

C. C. Mengel & Bro. Company, Louisville, is in the market for a pump to be installed in connection with an artesian well which has been sunk on its mahogany concession in Yucatan.

The plant of the Southern Wall Plaster Company, Louisville, which was burned recently, has been rebuilt and will be put in operation within a few weeks. New mixers were installed by the J. H. Day Company, Cincinnati, and the electrical motors were bought from the James Clark, Jr., Electrical Company, Louisville.

A permit for the construction of the concrete foundations of its new power house has been secured by the Kentucky Electrical Company, Louisville. Contracts for the superstructure will be let early next month. The Alberger Condenser Company, New York, has been awarded a contract to install two large condensers in the plant, and Henry R. Worthington, Inc., New York, secured the contract for the necessary boiler feed pumps. The heaters will be installed by the Platt Iron Works, Chicago. Plans have been drawn for a plant which will be constructed in four sections, as the growth of the city demands. Sargent & Lundy, Chicago, are the designers of the plant.

The American Machine Company, Louisville, now has under construction two electric elevators which are to be installed in the Commercial Building at Monterey, Mexico. A good demand for elevators is reported by this concern.

A combination of many of the largest coal mines of eastern Kentucky is being negotiated by Peyton N. Clarke, a well-known capitalist of Louisville. The companies involved are the Continental Coal Corporation, Straight Creek Coal & Coke Company, Straight Creek Coal Mining Company, Left Fork Coal Company and Wallsend Coal & Coke Company, which control about 18 miles. A new company, with a capital stock of $3,000,000, will probably be formed to take over the properties, and in that event it is likely that additional development work will be undertaken.

The Leyman Motor Company has been formed to represent the Buick automobile in Louisville, and has leased quarters at Jackson street and Broadway. A large repair shop will be equipped. H. S. Leyman, Cincinnati, is head of the company.

The Fiscal Court of Adair County, at Columbia, Ky., has decided upon the construction of a steel bridge costing $5000 over Green River.

The George Mayo Machine Company has purchased the machinery of the Wisdom Hosiery Mills of Paducah, Ky., its business having been wound up. The plant has not been in operation for several years.

The plant of the Richmond Electric Company, Rich-

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mond, Ky., was demolished April 12 by an explosion which destroyed the engine and boiler, which had only recently been installed, the loss being estimated at $10,000. It is understood that the plant will be rebuilt at once.

The Wilhoit Consolidated Coal Company has been organized at Pineville, Ky., with $50,000 capital stock, and will develop some coal property in Harlan County. Roy Wilhoit, Frankfort, Ky., is the principal member of the company, which plans to begin work at once.

The Kister Lumber & Furniture Company has been organized at Bowling Green, Ky., with $25,000 capital stock, for the manufacture of furniture and the operation of saw and planing mills. F. L. Kister, Jr., W. E. Kister and Mrs. Dora Kister are the incorporators.

It is reported that the Chesapeake & Ohio Railway is planning the construction of a bridge across the Ohio River between South Portsmouth, Ky., and Portsmouth, Ohio.

G. B. Jones is making inquiries for concrete block machinery and other cement equipment. His address is Winchester, Ky.

The Fiscal Court of Scott County, at Georgetown, Ky., is in the market for a road roller. The court has decided upon the construction of seven new steel bridges.

The Mt. Pleasant Auto & Machine Company has been incorporated at Mt. Pleasant, Tenn., with $5000 capital stock, by Ernest Irwin, Percy S. Chandler and others.

The Lenoir Light & Power Company, Lenoir, Tenn., has filed articles of incorporation. Its capital stock is $10,000, and T. C. Foster, J. R. Brower, H. C. Foster and others are the incorporators.

The lighting and power companies of Memphis, Tenn., are entering strong protest against the bill now pending in the Tennessee Legislature to provide for a bond issue of $1,000,000 by Memphis for the construction of a municipal electric light and power plant.

J. W. Finch, who has invented a wagon brake for which many improved features are claimed, has been negotiating with Secretary Winn of the Chamber of Commerce of Chattanooga, Tenn., with reference to the establishment of a plant in that city.

New machinery will be installed in an addition to the plant of the Scholze Tanning Company, Chattanooga, Tenn., which is to be erected at a cost of $15,000.

J. R. East of La Follette, Tenn., is organizing a company for the manufacture of a machine to be used in the construction of railroad tunnels.

The Rising Creek Marble Company has been incorporated at Knoxville, Tenn., with $20,000 capital stock, by O. Kundson, Noble Smithson, Guy Smithson and others. It will operate a marble quarry in Knox County.

The Johnson City Foundry & Machine Works, Johnson City, Tenn., has arranged to manufacture the device of the Automatic Wire Reel Company, which is intended for use by telephone companies in laying wire.

The Memphis Natural Gas & Oil Company, Memphis, Tenn., has increased its capital stock from $200,000 to $300,000.

A good deal of power equipment, as well as operating machinery, will be purchased by the Memphis Rice Mill Company, which has been incorporated with $100,000 capital stock, with J. D. Mack of Crowley, La., as general manager. The plant will have a daily capacity of 5000 bushels. The cost of the mill and equipment will be $60,000.

Mohr, Michael & Bros., Paducah, Ky., are planning the establishment of a plant for the manufacture of saddlery and harness at Memphis, Tenn.

The Murch Bros. Construction Company is erecting a power and engine house for the Memphis Union Station Company, Memphis, Tenn. It will cost $50,000 and is fireproof.

The John G. Duncan Company, Knoxville, Tenn., is in the market for an iron lathe with a 22 to 26 in. swing, a small planer and a 20-in. drill press. Second-hand equipment is preferred.

J. H. Erwin of Memphis is planning the erection of a cotton mill in that city which would represent an investment of $250,000. South Carolina interests will be represented.

The New Virginia Power Company, East Radford, Va., has purchased the plant of the Radford Water Power Company and is planning the development of the water power of New River.

The City Commissioners of Shreveport, La., are considering the establishment of a pumping station for carrying the water supply of the city through Twelve-Mile Bayou.

The plant of the Baton Rouge Veneer Company, Baton Rouge, La., which was destroyed by fire, is to be rebuilt. Equipment for the manufacture of lumber, veneers and boxes will be installed.

E. O. Parker of Waldron, Ill., is negotiating with the Business Men's Club of Huntsville, Ala., concerning the establishment of an automobile factory. A committee was appointed to investigate the project.

Efforts are being made by the business interests of Gadsden, Ala., to establish a paper mill there for the purpose of consuming the low grade lumber produced in that territory which cannot be worked up into anything else at present.

An electric plant of 1400-hp. capacity is to be constructed at Troy, Ala., by the Standard Chemical & Oil Company, of which Fox Henderson is president. The plant will be used to operate two mills of the company.

The B. J. Robinson Machine Works, Vicksburg, Miss., has decided definitely upon the erection of an iron foundry and garage.

Homer, La., may take over and improve the electric light plant now operated by Edward Sawyers.

The Atlanta Motor Car Company, Atlanta, Ga., is reported to have under way plans for the construction of a factory for the manufacture of commercial trucks at New Orleans, La. The investment involved is $200,000. Clarence Houston is president of the company.

Bonds have been authorized by Bassfield, Miss., for the purpose of establishing a water works system.

An additional pump is to be installed in the water works plant at Tuscaloosa, Ala. F. G. Blair is president of the Water Works Commission.

A company is being formed at Aliceville, Ala., for the construction of a water works plant.

The Mercantile & Machine Company, Laurel Hill, N. C., recently incorporated with $10,000 capital stock, will erect a factory building, 35 x 100 ft., of brick and wood construction. The company will deal in merchandise and automobiles and do general machine repair work. At present it is in the market for pipe and fittings and one lathe and shaper. J. T. Flythe is president of the company.

The city of Newport News, Va., will vote on the issuance of $150,000 of bonds for the construction of an electric light plant.

The North Pacific Coast

PORTLAND, ORE., April 12, 1911.

Aside from an active and healthy demand for the smaller classes of tools, there is little feature to the machine tool market. Few large inquiries are coming out, and only scattered orders are received for tools of the heavier types. The volume of work on hand at most machine shops in this territory is considered satisfactory. Large inquiries for machinery of other classes are principally in connection with power and electrical development, which is expected to be one of the leading features of the North Pacific Coast market during the next few years. A few inquiries are coming up for complete saw mill outfits, but the principal business in this line is in the way of renewals, individual orders being rather light. The lumber industry is still comparatively quiet, and logging interests along the Columbia River are still working on a small scale. There is some business in crushers and dredges, and general contractors' equipment is increasingly active with the approach of summer. The development of agricultural industries in Oregon is giving rise to a good general demand for small machinery of various kinds.

Two of the new submarine torpedo boats for the Government, for which contracts have just been let, will be built by the Moran Company, Seattle, Wash.

Bids will be received April 14 by the Board of Public Works of Seattle, Wash., for water wheels and generators to be used in the Lake Union substation. The inquiry includes one 2500-hp. turbine water wheel with governor, one 50-hp. impulse wheel, one 1500-kw. alternating current generator and a 30-kw. exciter.

The Yaquina Electric Company has succeeded the Newport Power Company, Newport, Ore., and is arranging for the installation of a lot of new equipment.

Rapid progress is being made on the new addition to the Griffin Wheel Works, Tacoma, Wash., and the new shop will be ready for operation early in the fall.

The Spokane Hydraulic Motor & Irrigation Company has been incorporated at Spokane, Wash., with a capital stock of $200,000, for the purpose of manufacturing and marketing the Zeigler current motor. W. G. Mulligan is president of the company.

The F. S. Steel Machine Company has been incorporated at Walla Walla, Wash., with a capital stock of $10,000, F. S. Steel being president. The company will operate a general machine shop, making a specialty of automobile work.

T. H. Scheumann has bought out the Chehalis, Wash., foundry. The plant has been overhauled and improved and will be operated on a special line of machinery for the use of gas works.

The Twin City Light & Traction Company, Chehalis, Wash., is preparing to build a new hydroelectric plant near its present power house on Cole Creek.

The Western Granite Company, Baker City, Ore., will shortly install an electric power outfit at its quarry.

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The Cove Power Company is installing a hydroelectric plant on Crooked River, near Culver, Ore.

The Central Oregon Well Company is starting a machine shop at Culver, Ore.

Work will be started shortly on an electric power plant for the Valley Development Company at Kelso, Ore.

The McCully-Rumble Land & Power Company is preparing to install a new electric power plant at Elgin, Ore.

The Seattle Drydock Company, recently incorporated at Seattle, Wash., with a capital stock of $1,000,000, intends to start a large ship repair plant on Elliott Bay. George Bennett and H. G. Sauer are the promoters of the project.

The Morgan-Stansbie Company, Eugene, Ore., is planning to add a number of new machines to its planing mill.

The Pacific Car & Equipment Company has been incorporated at San Francisco, Cal., with a capital stock of $250,000, by N. B. Livermore, C. G. Myers, A. H. Reddington, P. F. Schneider and W. H. Siebrecht. The company will operate the large car and locomotive repair shops which Mr. Livermore and associates have been erecting at South San Francisco.

The Sequoia Chain-Band Saw Company has been incorporated at Oakland, Cal., with a capital stock of $10,000, by J. H. Wyruck, J. V. Devoto and John Horning.

The Capital Box Company, Sacramento, Cal., whose large factory was recently destroyed by fire, will be in the market shortly for a complete outfit of new machinery.

The Water Commission of Lewiston, Idaho, has let a contract for repairs to the municipal steam pumping plant to the Idaho Foundry & Machine Company.

The Jordan-Endret Lumber Company, Dorris, Cal., has installed a 200-ft. slab conveyor.

A complete rock crushing plant, including a No. 10 McCully crusher, is being delivered to the Rhyolite Crushed Rock Company, Corona, Cal.

The Hutchinson Construction Company, Oakland, Cal., has placed orders for a No. 5 and a No. 3 McCully crusher and a screening outfit.

The Brown Hoisting Machinery Company has just delivered a locomotive crane to the Santa Cruz, Cal., Portland Cement Company.

Estimates are about complete on material required for the navy collier to be built by the navy yard at Mare Island, Cal.

The McCloud River Lumber Company, operating at McCloud, Cal., has purchased a General Electric turbine generator and will operate part of its plant by electricity. It has also purchased two Shay switching engines.

A meeting of creditors of Henshaw, Bulkley & Co., prominent San Francisco machinery merchants, has been set for April 18. According to the company's statement, the apparent assets exceed the liabilities.

The hull of a new gold dredger, machinery for which is being built by the Yuba Construction Company, Marysville, Cal., has just been launched in the Yuba River near that place. It is said to be the largest gold dredger ever built, being about twice the size of most of those now used in California, and having a daily capacity of about 10,000 cu. yd. of earth.

Western Canada

WINNIPEG, MAN., April 15, 1911.

John C. Eaton, president of the T. Eaton Company, Toronto, has announced that his company will build a great department store at Calgary, Alberta.

Frank P. Jones, general manager of the Canada Cement Company, Montreal, says that the company will as soon as possible establish a plant in Winnipeg. Its capacity is to be 400,000 barrels per annum.

The Progressive Tugboat Company, Vancouver, B. C., last week received a cargo of boilers and machinery from the McKie & Baxter Works, Glasgow, Scotland. Most of this cargo was transhipped to the Tehuantapec Railway from a Morrison Line vessel, which carried it across the Atlantic. A Canadian-Mexican steamer carried it from the Pacific terminus of that railway.

A bond issue of $175,000 for sewer and water extensions and one of $50,000 for an incinerator has been authorized by the ratepayers of Moose Jaw, Sask.

The British Columbia Telephone Company, Victoria, B. C., requires equipment for 900 additional telephones.

Tenders are called for, up to May 15, by F. E. Lily, Municipal Clerk, Penticton, B. C., for the construction of infiltration chambers, reservoir works and excavation for and laying of pipes for the local water works system; for galvanized wrought iron; for hydrants, valves and other fittings; for meters; for steel pipe, lap welded.

Up to April 30 tenders will be received by John Marshall, chief engineer of the Trunk Sewer Works, Regina, Sask., for tenders for sewage pumps and motor, switchboard and apparatus. The capacity of the pump is to be 1,000,000 gal. per 24 hours.

The Ontario Wind Engine & Pump Company, Toronto, is erecting a warehouse in Winnipeg to cost $50,000.

The Hudson's Bay Company has purchased land in Winnipeg on which it is to build a $2,000,000 store.

E. Loftus, Winnipeg, is preparing to build a large business block in that city.

Peter Lyall, Jr., has had plans approved by the municipal authorities, Winnipeg, for the building of a 14-story structure there.

At Saskatoon, Sask., Cushing Bros. will erect a large planing mill, sash and door factory. Electricity produced by steam plant will be the motive power for the machinery.

The contract for the building of coal conveyers and bunkers for the power house at Victoria Park, Calgary, Alberta, has been awarded to Phillips & Lang, Chicago. The conveying machinery will be supplied by the C. W. Hunt Company, New York. Contracts for the equipment of the electrical plant at Victoria Park will probably go to the Allis-Chalmers-Bullock Company.

The ratepayers of Revelstoke, B. C., have approved a by-law to raise $50,000 to complete the municipal power plant.

There is a very large demand for automobiles in the Canadian West, the farmers being in the market more than ever before. At agricultural points where the farmers are wealthy, such as Weyburn, Indian Head, Swift Current, North Battleford and at several places along the Soo line, several carload lots have been laid down at each place.

Robert E. Kennedy, New Westminster, B. C., announces that the Western Steel Corporation has purchased 2000 acres of land on the Fraser River, and that a steel plant will be erected there within the next three years. A start will be made this year. Iron deposits up the Pacific Coast have been secured.

At the Dominion Bridge Works, Winnipeg, big preparations are being made for an active summer. Further equipment will be added.

The Anthers Foundry Company, Ltd., of Toronto, has purchased 4 acres of land at Winnipeg, on which a plant will be established this summer. The plans are now in the hands of the architect.

The Wortman & Ward Company, manufacturer of pumps and farming tools, has bought a site in Winnipeg. One building has been erected already, and the company announces that it will extend the plant as soon as Winnipeg is ready to supply electricity for power.

It is announced that a glass factory to cost $100,000 will be established at Medicine Hat, Alberta. One of the leading men in this new industry is D. C. Cameron, president of the Rat Portage Lumber Company, Ltd., Winnipeg.

The Czerwinski Box Company, Winnipeg, will add two more stories to its plant, at a cost of $75,000, and additional machinery will be put in.

Preparations are being made for the erection of a large cement plant in Alberta, about 120 miles west of Edmonton. The scheme is being promoted by A. Haynes of Spokane, Wash., who is getting Edmonton capitalists interested to get the industry under way. The intention is to build a plant that will have an output of 1000 barrels per day.

Texas

AUSTIN, TEXAS, April 15, 1911.

The demand for electrical machinery and equipment shows a notable increase in Texas, the Southwest and Mexico during the last few months. Besides the several large hydroelectric projects that are on foot, many of the existing electric power enterprises are being enlarged. In Mexico the use of electricity in the operation of mines is becoming quite general. This is also true of the mining industry in New Mexico and Arizona. Plans are being prepared for the construction of a number of important interurban electric railroads in Texas, all of which will require a considerable amount of electrical machinery and equipment.

The authoritative announcement is made that former Governor David R. Francis, St. Louis, Mo., is at the head of a syndicate that has had the preliminary surveys made and other work done toward the construction of a great system of irrigation and hydroelectric plant in western Texas. Two large dams are to be constructed, one across the Pecos River and the other across Devil's River, and the water of those two streams utilized to irrigate about 350,000 acres of land and to generate about 30,000 hp. of electrical energy. Power transmission lines will be constructed to San Antonio and a number of towns in western and southwestern Texas.

C. H. Alexander of Dallas, who is at the head of a syndicate that is developing the power resources of the Colorado River in Texas, is preparing to install a second hydroelectric

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plant, to be located near Kingsland, where he and associates will construct another reinforced dam across the Colorado River. It is stated that about 10,000 hp. will be developed by this proposed plant. The Colorado River Power Company, in which Mr. Alexander is largely interested, is constructing a reinforced concrete dam and hydroelectric plant on the Colorado River, near Marble Falls.

The work of constructing a new cotton compress at Harlingen by O. P. Slack of Houston and associates will soon be started. It will cost about $25,000.

The lowest bid received by the Board of Commissioners of Galveston for the construction of a duplicate water main across Galveston Bay via the new causeway was from Isaac Heffron of that city for $66,389, and he will probably be given the contract. The duplicate main is to be 30 in. and approximately 10,766 ft. long.

A system of water works will be installed at Eastland, Texas, bonds to the amount of $15,000 having been recently voted for the purpose.

The construction of a drainage system in a district that has been created in Cameron County, and for which $204,000 of bonds have been voted and issued, will require considerable ditching and other machinery, it is stated. The proposed system will bring about the reclamation of about 81,000 acres of land.

The Board of Commissioners of Galveston County has under consideration the creation of another drainage district in that county and the calling of an election to vote on issuing bonds for constructing the proposed system. Considerable dredging and ditching machinery will be required if the proposition is favorably acted upon.

Two new steel bridge will be constructed across the Brazos River in Brazoria County, bonds to the amount of $100,000 having been recently voted by the tax-payers of the county for the purpose. The county judge, Angleton, Texas, can give information.

The Balsas Power & Irrigation Company, in which German capital is largely interested, and which was promoted by A. B. Adams, Inc., of the City of Mexico, is having surveys made for its proposed irrigation system and hydroelectric plant that it is to establish on the Balsas River, in the state of Guerrero. The hydroelectric plant is to have a minimum capacity of abou 40,000-hp., it is stated. Tentative contracts for the sale of a large amount of electric power have already been entered into by the company with mine owners and others, situated within a radius of about 100 miles of the proposed plant.

The installation of a gas manufacturing plant and the construction of a distributing system at Monterey, Mex., will soon be started by William Mackenzie of Toronto, Canada, president of the Canadian Northern Railroad, and associates. They obtained a concession from the State and municipal governments for the proposed enterprise some time ago. The Mackenzie syndicate already owns the water works, sewers and electric street railway system in Monterey. Lewis Lukes is in charge of the several properties in that city.

The Guadalajara Gas Company will soon finish the installation of a gas plant and construction of a distributing system in Guadalajara, Mex. The work is being done under the direction of W. A. Aldrich, Grand Rapids, Mich.

The Pioneer Smelting Company will erect a large smelter at or near Tucson, Ariz.

The Arizona Consolidated Smelting & Mining Company will soon begin the construction of a large smelter near Tucson, Ariz. The plant will cost about $350,000.

J. F. Wilkie of Bisbee, Ariz., will erect a 50-ton ore reduction mill near Courtland, Ariz.

The East Side Gold Mining Company will install a steam hoist and compressor at its mines near Bisbee, Ariz.

Dr. J. W. Yard and Martin Fishback of El Paso, Texas, will install a steam hoist and pumping plant at their mine in the State of Sinalon, Mexico.

Paul Traylor and associates will install a concentrating and cyanide plant at their mine near Sabinal, State of Chihuahua, Mexico.

The Dolores Mining Company will enlarge its ore reduction mill at Dolores, State of Chihuahua, Mexico. A new 150-hp. Corliss engine, two sand tanks, concentrating tables and other equipment will be installed.

D. C. Sutton and associates will equip the shafts of their mines, near Sabinal, State of Chihuahua, Mexico, with heavy machinery. A churn drill will also be installed.

The International Gold & Copper Company will install an ore reduction plant at its mines near Guyimopas, State of Chihuahua, Mexico.

The Guyimopas Mining Company will install an ore reduction mill at its mines near Guyimopas, State of Chihuahua, Mexico.

The City Council of Monterey, Mexico, contemplates installing a municipal electric light and power plant and system.

The Beaumont Waterworks Company, Beaumont, has made a proposition to the City Council to either sell the plant to the city or be permitted to charge higher rates for service if it is to be required to seek a new source of water supply to avoid the chances of impregnation from ocean water. The Council has the proposition under consideration.

Fred B. Pittman of New Orleans, La., is arranging to establish a cracker factory in San Antonio, Texas. It is planned to invest about $200,000 in the enterprise.

The cotton gin of the Harlingen Ice & Gin Company, at Harlingen, will be enlarged.

The Consolidated Mutual Reservoir Company, Grand Falls, has filed its charter in the Secretary of State's office. It has a capital stock of $600,000. The incorporators are J. F. Gaylor, J. I. Earley, M. T. Endaly, W. A. White and others.

An election will be held by Clarksville on April 25 to vote on the question of issuing bonds in the amount of $10,000 for water works extensions and improvements.

The Wiesenborn Mfg. Company, Houston, has recently completed the erection of a new factory for the manufacture of wire fencing and will erect another building in the near future, to be used for foundry and machine shop purposes. The company is using gasoline engines at present for operating its plant, but later on expects to use electricity. A number of galvanizing kettles will also be installed.

B. Gardner, Glen Flora, will erect a cotton gin at Bay City.

The Saratoga Iron & Steel Company, Saratoga, has been incorporated with a capital stock of $15,000. The incorporators are C. G. Hooks, H. L. Graham and W. P. Vick.

The ice plant owned by the business men of De Leon, which cost $12,500, has doubled its capital stock and taken over the water and light system.

The Lufkin Foundry & Machine Company, Lufkin, has increased its capital stock from $125,000 to $200,000.

The Princeton Waterworks Company, Princeton, has been incorporated with a capital stock of $5000. The incorporators are J. H. Goodwin, J. H. Stinson and C. A. Wilson.

Government Purchases

WASHINGTON, D. C., April 17, 1911.

Commissioners of the District of Columbia will open bids April 25 for furnishing two steam engines and two generators for use in the McKinley Manual Training School, Washington.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids April 11, as follows:

Class 31.—For furnishing and installing 10 mechanical stokers—No bids.

Class 41.—Two electric hoists—Bidder 35, Estate of Alfred Box, Philadelphia, Pa., $425; 108, Lidgerwood Mfg. Company, New York, $303 and $440; 115, V. W. Mason & Co., Providence, R. I., $575; 118, Marine Electric Company, Portsmouth, Me., $265; 182, Toledo Bridge & Crane Company, Toledo, Ohio, $560; 201, Williamson Brothers Company, Philadelphia, Pa., $230 and $245.

Class 51.—One radial drill, complete—Bidder 7, American Tool Works, Cincinnati, Ohio, $1090; 71, Fairbanks Company, Washington, D. C., $819; 82, Griscom-Spencer Company, New York, $1123; 100, J. P. Kemp, Baltimore, Md., $996.50, $1065.20, $1076.80 and $1145.50; 124, Manning, Maxwell & Moore, New York, $1006; 138, Niles-Bement-Pond Company, New York, $1015.

Class 61.—One band sawing machine—Bidder 17, American Woodworking Machinery Company, Rochester, N. Y., $410; 70, J. A. Fay & Egan Company, Cincinnati, Ohio, $540; 71, Fairbanks Company, Washington, D. C., $527; 74, Frevert Machinery Company, New York, $518; 100, J. P. Kemp, Baltimore, Md., $315.20 and $292.20; 124, Manning, Maxwell & Moore, New York, $527; 130, Norfolk Woodworking Machinery Company, Norfolk, Va., $513; 147, Oliver Machinery Company, New York, $664, $575, $561, $540 and $526.

Bids were opened March 14 by the inspector of the first lighthouse district, Portland, Maine, for furnishing two oil engine compressor plants for installation at the Whaleback Light Station, Maine, as follows: American Air Compressor Works, $3273; De La Vergne Machine Company, $3460; Charles J. Jager Company, $5550; Frani E. Davis, $4920.

The Isthmian Canal Commission, Washington, opened bids April 11 for furnishing one pneumatic post drill, as follows: Chicago Pneumatic Tool Company, New York, $70; Manning, Maxwell & Moore, New York, $75.

The Valley Mould & Iron Company, Sharpsville, Pa., manufacturer of ingot molds, is operating its plant to fair capacity on contracts from various steel works. The month of March showed increased operations over any previous recent month, while the present month will surpass March. The company recently started work on the erection of a large brick office building, which will contain the executive and general offices, a dining hall and a well equipped hospital.

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from store—

Refined Iron:

1 to 1⅝ in. round and square; 1½ to 4 in. x ⅜ to 1 in.	₩ lb 1.75¢
1½ to 4 in. x ¼ to 5-1	₩ lb 1.85¢
Rods—⅝ and 11-16 round and square	₩ lb 1.85¢

Angles: Cts ₩ lb

3 in. x ¼ in. and larger	2.00¢
3 in. x 3 16 in. and ⅜ in.	2.25¢
1½ to 2½ in. x ⅜ in.	2.10¢
1½ to 2¾ in. x 3-16 in. and thicker	2.00¢
1 to 1¾ in. x 3-16 in.	2.10¢
1 to 1¾ x ⅛ in.	2.20¢
⅝ x ⅛ in.	2.30¢
¾ x ⅛ in.	2.40¢
⅝ x ⅛ in.	3.45¢
½ x 3-32 in.	4.25¢

Tees:

1 in.	2.65¢
1¼ in.	2.45¢
1½ to 2½ x ¼ in.	2.15¢
1½ to 2½ x 3-16 in.	2.35¢
3 in. and larger	2.05¢
Beams	2.00¢
Channels, 3 in. and larger	2.00¢
Bands—1½ to 6 x 3-16 to No. 8	2.30¢
"Burden's Best" Iron, base price	3.15¢
Burden's "H. B. & S." Iron, base price	2.95¢
Norway Bars	3.60¢

Merchant Steel from Store—

	per lb.
Bessemer Machinery	1.90¢
Toe Calk, Tire and Sleigh Shoe	2.50@3.00¢
Best Cast Steel, base price in small lots	7¢

Sheets from Store—

Black	One Pass, C.R. Soft Steel.	R. G. Cleaned.
No. 16	₩ lb 2.55¢	2.80¢
Nos. 18 to 20	₩ lb 2.70¢	2.90¢
Nos. 22 and 24	₩ lb 2.75¢	3.00¢
No. 26	₩ lb 2.80¢	3.10¢
No. 28	₩ lb 2.95¢	3.30¢

Russia, Planished, &c.

Genuine Russia, according to assortment, ₩ lb 12 @14½

Patent Planished, W. Dewees Wood, ₩ lb A, 10¢; B, 9¢ net.

Galvanized.

Nos. 12 and 14	₩ lb 2.95¢
Nos. 22 to 24	₩ lb 3.30¢
No. 26	₩ lb 3.50¢
No. 28	₩ lb 3.80¢

No. 20 and lighter 36 inches wide, 25¢ higher

Genuine Iron Sheets—

Galvanized.

Nos. 22 and 24	₩ lb 5.75¢
No. 26	₩ lb 6.25¢
No. 28	₩ lb 7.25¢

Corrugated Roofing—

2½ in. corrugated.	Painted	Galvd
No. 24	₩ 100 sq. ft. $3.85	4.80
No. 26	₩ 100 sq. ft. 2.95	4.00
No. 28	₩ 100 sq. ft. 2.60	3.75

Tin Plates—

American Charcoal Plates (per box.)

"A.A.A." Charcoal:

IC, 14 x 20	$6.65
IX, 14 x 20	7.90

A. Charcoal:

IC, 14 x 20	$5.60
IX, 14 x 20	5.70

American Coke Plates—Bessemer—

IC, 14 x 20 107 lb	$4.50
IX, 14 x 20	5 50

American Terne Plates—

IC, 20 x 28 with an 8 lb. coating	$8 70
IX, 20 x 28 with an 8 lb. coating	10.40

Seamless Brass Tubes—

List November 17, 1908. Base price 18¢

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908. Base price 18¢

Copper Tubes—

List November 13, 1908. Base price 21¢

Brazed Brass Tubes—

List February 1, 1911. 19½¢ ₩ lb

High Brass Rods—

List February 1, 1911. 14¼¢ ₩ lb

Roll and Sheet Brass—

List February 1, 1911. 14¼¢ ₩ lb

Brass Wire—

List February 1, 1911. 14¼¢ ₩ lb

Copper Wire—

Base Price. Carload lots mill 13¾¢

Copper Sheets—

Sheet Copper Hot Rolled, 16 oz (quantity lots) ₩ lb 18¢

Sheet Copper Cold Rolled, 1¢ ₩ lb advance over Hot Rolled.

Sheet Copper Polished 20 in. wide and under, 1¢ ₩ square foot.

Sheet Copper Polished over 20 in. wide, 2¢ ₩ square foot.

Planished Copper, 1¢ ₩ square foot more than Polished.

METALS—

Tin—

Straits Pig ₩ lb 45 @[illegible]¢

Copper—

Lake Ingot	₩ lb 14 @16½¢
Electrolytic	₩ lb 13¾@14¢
Casting	₩ lb 13¾@14½¢

Spelter—

Western ₩ lb 6¼@6½¢

Zinc.

No 9, base, casks ₩ lb 8 ¢ | Open ₩ lb 9½¢

Lead.

American Pig	₩ lb 5 @5¼¢
Bar	₩ lb 6¼@6½¢

Solder.

½ & ½, guaranteed	₩ lb 27½@28 ¢
No. 1	₩ lb 25½@26 ¢
Refined	₩ lb 23 @23½¢

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Cookson	₩ lb @10½¢
Hallett's	@10¼¢
Other Brands	@9½¢

Bismuth—

Per lb $2.00@$2.25

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in lots for remelting 32¢

Rods & Wire Base Price 34¢

Sheets Base Price 35¢

Old Metals.

Dealers' Purchasing Prices Paid in New York

	Cents
Copper, Heavy cut and crucible	₩ lb 10.75@11.00
Copper, Heavy and Wire	₩ lb 10.50@10.75
Copper, Light and Bottoms	₩ lb 9.50@ 9.75
Brass, Heavy	₩ lb 7.00@ 7.25
Brass, Light	₩ lb 5.50@ 5.75
Heavy Machine Composition	₩ lb 9.25@ 9.50
Clean Brass Turnings	₩ lb 7.00@ 7.25
Composition Turnings	₩ lb 8.25@ 8.50
Lead, Heavy	₩ lb .....@ 3.75
Lead, Tea	₩ lb .....@ 3.50
Zinc Scrap	₩ lb .....@ 4.00

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Time is not the only saving effected through the use of **Nicholson Files.**

Their hard cutting surface and perfect temper gives them a **lasting quality** that makes them by far the most **economical** of all files to use.

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